Agriculture in Crisis: Post Annual Flooding Challenges and Support Mechanisms for Farmers of Thiruvananthapuram District

MSW DISASTER MANAGEMENT

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ABSTRACT

Agriculture plays an important role in Kerala, but the-frequent occurrence of floods and other climate-related events has reduced farmers' agricultural sustainability. The study aims to reveal the problems faced by farmers after repeated floods and whether any support mechanisms are in place to help them recover from the disaster. The objectives of the research include studying the socio-economic and agricultural impacts of frequent floods, the coping strategies of local farmers, and their adaptation strategies.

The methodology used in the research includes a descriptive cross-sectional research design, employing purposive sampling of 80 farmers from the Amaravila, Neyyattinkara, and Kollayil Panchayats in Thiruvananthapuram district. The primary data were gathered from 80 respondents using a structured interview schedule, and secondary data were obtained from government reports and published literature. The data were analysed using descriptive statistics, including frequencies and percentages, cross-tabulations, and Chi-square tests.

The study results show that the majority of participants are marginal farmers who have relied heavily on agriculture as an income-generating activity. It was found that bananas were the predominant crop grown in the region, and that some farmers in the cities of Amaravila and Neyyattinkara were greatly affected by the perennial problem of flooding, while others were affected by pests. While some farmers faced water scarcity in Kollayil, others were still facing challenges with irrigation facilities.

Floods were found to negatively affect farmers' earnings by reducing agricultural revenue and undermining their savings prospects, thereby leading to increased borrowing. In addition to agricultural challenges of labour and fertiliser prices, government compensation issues and market fluctuations were found to be playing a huge role in making farmers Strengthening climate-resilient agricultural practices, improving irrigation and drainage infrastructure, ensuring timely compensation, promoting crop diversification, and enhancing institutional support are essential for improving farmers' resilience and ensuring sustainable agricultural development.

Keywords: Agriculture, Farmers, Agriculture Crisis, Livelihood.

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CHAPTER I: INTRODCUTION

Introduction

Agriculture is one of the oldest and most important economic activities in the world and remains the primary source of livelihood for millions of people globally. In developing countries such as India, agriculture plays a crucial role in ensuring food security, generating employment, promoting rural development, and maintaining economic stability. According to the Census of India (2011), approximately 54.6 per cent of the total workforce is directly or indirectly dependent on agriculture for their livelihoods, underscoring the sector's continued significance despite rapid industrialization and urbanization. The sector contributes not only to the national economy, accounting for around 18.3 per cent of India's GDP in 2022–23, but to the social and cultural fabric of rural communities.

India is characterized by diverse agro-climatic conditions that support the cultivation of a wide range of crops. However, agricultural production is highly dependent on natural resources and climatic conditions. Variations in rainfall, temperature, and weather patterns significantly influence crop productivity and farmers' income. In recent decades, the agricultural sector has faced increasing challenges due to climate change, environmental degradation, rising production costs, market fluctuations, and natural disasters. These challenges have made farming a risky and uncertain occupation, especially for small and marginal farmers (Kumar & Parikh, 2001).

Kerala, located in the southwestern part of India, is known for its rich biodiversity, tropical climate, and diverse agricultural practices. Agriculture has historically been a major source of livelihood for rural households in the state. Crops such as paddy, coconut, banana, rubber, pepper, and other spices contribute significantly to Kerala's agricultural economy. However, the state has witnessed considerable changes in its agricultural sector due to urbanization, land-use changes, labour shortages, and climate-related disasters. Among these challenges, recurrent flooding has emerged as a major threat to agricultural sustainability and farmer livelihoods. (Nair & Menon, 2007).

The floods that affected Kerala in recent years, particularly in 2018, 2019, and subsequent years, caused extensive damage to agricultural land, crops, livestock, irrigation systems, and rural infrastructure. Thousands of farmers suffered severe economic losses as standing crops were destroyed, and fertile agricultural land was affected by soil erosion, waterlogging, and sediment deposition. The impacts of these floods extended beyond immediate crop losses,

creating long-term challenges for agricultural recovery and livelihood security (KSDMA, 2019).

The present study focuses on the concept of post-annual flooding, referring to the conditions and challenges farmers face after recurring annual floods. While the immediate effects of flooding receive considerable attention, the long-term consequences often remain inadequately addressed. Farmers continue to face problems such as declining productivity, indebtedness, livelihood insecurity, delayed compensation, and limited access to institutional support even after floodwaters recede(IPCC, 2021).

The study specifically examines the experiences of farmers in the Amaravila, Neyyattinkara, and Kollayil areas of the Thiruvananthapuram district. These panchayats were purposively selected for their recurring exposure to annual flooding, the predominance of small and marginal farming households, and the relatively limited documentation of post-flood agricultural conditions in this part of the district compared with more extensively studied regions in northern Kerala. Understanding the challenges faced by farmers in these regions is important for developing effective support mechanisms and sustainable agricultural recovery strategies. The study also explores the coping strategies adopted by farmers and evaluates the role of government agencies, cooperatives, and other institutions in supporting affected farming communities (Narayanan, 2019; Aryal, 2020). The study is based on primary data collected through structured interviews and field surveys conducted among farming households in the selected panchayats, supplemented by secondary data from government reports, agricultural department records, and published literature. The scope of the study is limited to small and marginal farmers who experienced flood-related agricultural losses between 2018 and 2023.

Statement of the problem

Agriculture is highly dependent on environmental conditions, making farmers particularly vulnerable to natural disasters and climate-related hazards. In recent years, the increasing frequency and intensity of floods have emerged as a major challenge to agricultural sustainability in Kerala. Recurrent flooding has caused extensive damage to crops, agricultural land, irrigation facilities, and rural infrastructure, resulting in significant economic losses for farming communities. Although floods are often viewed as temporary events, their effects

continue long after the water recedes, creating long-term livelihood challenges for farmers (IPCC, 2018).

The agricultural sector in Kerala has experienced severe setbacks due to the recurring floods of 2018, 2019, and subsequent years. Many farmers lost standing crops, seeds, fertilizers, livestock, and farming equipment during these disasters. Floodwaters also caused soil erosion, waterlogging, and land degradation, reducing agricultural productivity and affecting future cultivation. The repeated occurrence of such disasters has weakened the economic stability of farming households and increased their dependence on loans and external assistance. Small and marginal farmers are particularly affected because they possess limited resources and have a lower capacity to recover from losses (Kerala State Disaster Management Authority (KSDMA, 2019).

Apart from physical damage to agricultural land and crops, farmers also face economic challenges, including rising cultivation costs, fluctuating market prices, and declining profitability. Delays in receiving compensation and disaster relief further aggravate their difficulties. Many farmers report that the compensation provided is either insufficient or not received on time, making it difficult to restart agricultural activities. The lack of timely financial support often forces farmers to borrow money from informal sources, leading to indebtedness and financial insecurity (Nabarad, 2018).

The situation varies across different regions. In Amaravila, farmers face repeated flood-related crop losses and require climate-resilient agricultural practices, quality crop varieties, and timely compensation. In Neyyattinkara, waterlogging, delayed compensation, and unstable market prices negatively affect agricultural production and income. In Kollayil, although flooding is less frequent, farmers face severe water scarcity during the summer months, inadequate irrigation facilities, and delays in receiving support during agricultural crises. These location-specific challenges highlight the diverse nature of agricultural vulnerability and the need for localized solutions (IPCC, 2021)

Despite government schemes such as crop insurance, disaster compensation, agricultural subsidies, and farmer welfare programs, several gaps remain in their implementation and accessibility. Many farmers lack awareness of available schemes, while others encounter bureaucratic procedures that delay assistance. Consequently, institutional support often fails to address the immediate and long-term needs of affected farmers adequately (Gulati, Terway & Hussain 2018). Therefore, the central problem of this study is to understand the extent to which

post-annual flooding and related environmental challenges affect the livelihoods of farmers in Amaravila, Neyyattinkara, and Kollayil. The study seeks to examine the economic, social, and agricultural impacts experienced by farmers, assess the effectiveness of existing support mechanisms, and identify the coping and adaptation strategies adopted by farming households. Understanding these issues is essential for developing effective interventions, improving disaster response systems, and promoting sustainable agricultural recovery in vulnerable regions.

Background of the study

Agriculture has been the foundation of rural livelihoods and economic development in India for centuries. It continues to support a significant proportion of the country's population by providing employment, income, and food security. In Kerala, agriculture occupies a special place in the socio-economic structure of rural communities. The state is known for cultivating crops such as paddy, coconut, banana, rubber, pepper, and other spices that contribute substantially to household livelihoods and the local economy. Traditionally, Kerala's favourable climatic conditions, fertile soils, and abundant rainfall supported diverse agricultural activities. However, over the years, significant environmental, economic, and social changes have affected the sustainability of farming in the state (Singh D 2014).

One of the major challenges confronting Kerala's agricultural sector is the increasing occurrence of climate-related disasters. Climate change has altered rainfall patterns and increased the frequency of extreme weather events, including floods, landslides, droughts, and cyclones. Among these, flooding has emerged as a serious threat to agricultural production and farmer livelihoods. The severe floods that affected Kerala in 2018, 2019, and subsequent years caused widespread destruction across the state. Large areas of agricultural land were submerged, standing crops were destroyed, irrigation systems were damaged, and thousands of farmers suffered substantial economic losses. These disasters demonstrated the vulnerability of Kerala's agricultural sector to environmental shocks and highlighted the need for effective disaster preparedness and recovery measures (Mishra & Singh, 2010).

The impact of floods on agriculture extends beyond immediate crop loss. Floodwaters often result in soil erosion, nutrient depletion, waterlogging, and the deposition of sand and debris on agricultural land. These conditions reduce soil fertility and make cultivation difficult even after floodwaters recede. Consequently, farmers face long-term reductions in productivity and

income. Repeated flooding also increases cultivation costs, as farmers must invest additional resources to restore damaged land, purchase new seeds, and repair agricultural infrastructure. Such challenges place considerable financial pressure on farming households and often lead to indebtedness and livelihood insecurity. The situation is particularly relevant in areas such as Amaravila, Neyyattinkara, and Kollayil in the Thiruvananthapuram district. Farmers in Amaravila frequently experience flood-related crop damage and require climate-resilient farming practices and timely compensation. In Neyyattinkara, waterlogging, market price fluctuations, and delayed compensation create additional challenges for agricultural sustainability. Kollayil presents a different situation, in which water scarcity during the summer season poses a greater threat than flooding. Despite these differences, farmers in all three areas face uncertainties that affect agricultural productivity and livelihood security. Various government departments, cooperatives, and financial institutions have introduced schemes such as crop insurance, disaster compensation, subsidies, and agricultural support programs to assist farmers. However, studies indicate that implementation delays, lack of awareness, and administrative difficulties often limit the effectiveness of these initiatives. Therefore, understanding the experiences of farmers in flood-affected and climate-vulnerable areas is essential for identifying existing challenges and improving support mechanisms.

The present study seeks to explore the agricultural crisis faced by farmers in the context of post-annual flooding and related environmental challenges. The study aims to understand the impact of these challenges on livelihoods, examine coping and adaptation strategies, and assess the role of institutional support in promoting sustainable agricultural recovery (Folke C 2006).

Relevance and Significance of the Study

Agriculture remains one of the most important sectors supporting the livelihoods of rural communities in India. In Kerala, many households continue to depend on farming and allied activities for their income and food security. However, the increasing frequency of floods, climate variability, and environmental change has created serious challenges for agricultural sustainability. The repeated floods experienced in Kerala over the past several years have highlighted the vulnerability of farmers and the urgent need to understand the long-term impacts of such disasters on agricultural livelihoods. In this context, the present study is highly relevant as it focuses on the agricultural crisis faced by farmers in the aftermath of recurring

floods and related environmental challenges. The relevance of this study lies in its attempt to understand the real-life experiences of farmers living in vulnerable regions such as Amaravila, Neyyattinkara, and Kollayil. These areas face various agricultural challenges, including flood damage, waterlogging, delayed compensation, fluctuating market prices, and seasonal water scarcity. By examining these location-specific issues, the study provides a comprehensive understanding of how environmental and economic factors influence agricultural productivity and livelihood security. Such an understanding is essential for identifying the needs and priorities of farming communities and for developing effective interventions (Nair & Menon, 2007).

The study is significant because it explores not only the physical impacts of floods on agriculture but also their economic, social, and psychological consequences. Repeated crop losses, declining income, increasing indebtedness, and uncertainty regarding future cultivation often affect the overall well-being of farmers and their families. Understanding these multidimensional impacts is important for developing holistic approaches to agricultural recovery and rural development. The study's findings can contribute to a deeper understanding of the relationship between environmental disasters and livelihood vulnerability among farming communities.

Another important significance of the study is its focus on coping strategies and adaptation mechanisms adopted by farmers. Farmers often respond to agricultural crises through various methods such as crop diversification, alternative employment, water conservation practices, and participation in government support programs. Examining these strategies can provide valuable insights into the resilience of farming communities and help identify successful practices to promote in other vulnerable regions. The study also evaluates the effectiveness of institutional support mechanisms, including compensation schemes, agricultural subsidies, crop insurance programs, and extension services. The study's findings may be useful to policymakers, government agencies, agricultural departments, local self-government institutions, social workers, and development organizations involved in rural development and disaster management. The study can assist in identifying gaps in existing policies and support systems, and provide recommendations to improve agricultural resilience and disaster preparedness. Furthermore, it contributes to the growing body of knowledge on climate change, agricultural vulnerability, and sustainable livelihood development.

Overall, the study is significant because it addresses an important contemporary issue affecting farmers and rural communities. By exploring the challenges, coping strategies, and support mechanisms associated with post-annual flooding, the research seeks to contribute towards the development of more effective policies and sustainable solutions that can enhance the resilience and well-being of farming households.

The present study is significant because it examines the challenges faced by farmers after recurring annual floods in the Amaravila, Neyyattinkara, and Kollayil areas of the Thiruvananthapuram district. It provides an understanding of how post-annual flooding affects agriculture, livelihoods, and the socio-economic conditions of farming households. The study also evaluates the coping strategies adopted by farmers and the effectiveness of government schemes and institutional support mechanisms in helping them recover from flood-related losses. The findings will be useful for policymakers, agricultural departments, local self-government institutions, social workers, researchers, and non-governmental organizations in developing better disaster management strategies, improving agricultural policies, and promoting climate-resilient and sustainable farming practices. Furthermore, the study contributes to the existing body of knowledge on post-flood agricultural recovery and can serve as a reference for future research in agriculture, disaster management, and social work.

Chapterization

The Chapterization of the dissertation is as follows:

Chapter I: Introduction

Chapter II: Review of literature

Chapter III: Methodology

Chapter IV: Data Analysis and Interpretation

Chapter V: Findings, Suggestions, and Conclusion

References and Annexures will be appended in the following Chapter

CHAPTER II:
LITERATURE REVIEW

2.1 Introduction

A literature review is the process of reviewing, summarizing, and critically evaluating existing research on a particular topic. It is based on the assumption that knowledge accumulates over time and that researchers build on the work of previous scholars (Neuman 2014). A literature review is a systematic look at existing research, articles, books, and reports on a topic. It helps a researcher understand what's already known, spot gaps in that knowledge, and build a theoretical base for their own study. It also shapes the research objectives, guides the choice of methods, and helps in interpreting results. By comparing how different scholars have tackled similar issues, researchers can better position their own work within the broader body of knowledge.

In the present study, the literature review focuses on the crisis faced by farmers in the context of post-annual flooding and its impact on agricultural livelihoods. Various studies have highlighted the effects of floods, climate variability, crop loss, economic instability, indebtedness, environmental degradation, and social vulnerability on farming communities. Previous research has also examined the coping strategies adopted by farmers, the role of government support and agricultural policies, and the importance of resilience and sustainable recovery in disaster-prone areas.

2.2 Review of literature

2.2.1 Agriculture

Agriculture continues to be the backbone of India’s rural economy, yet the sector has been witnessing a steady decline in stability and income due to multiple interconnected challenges. Several studies note that even though a large share of the population still depends on farming, agricultural returns remain insufficient to sustain families, especially those with small and fragmented landholdings (Sainath, 2004; Mishra, 2012). Researchers widely agree that the agricultural crisis is not a sudden occurrence but a long-term outcome of policy gaps, climate pressures, market failures, and rural distress. Agriculture has always been the backbone of India’s rural economy, supporting millions of people directly or indirectly. However, in recent decades, farmers have been experiencing severe stress due to environmental, social, and

economic pressures. Several studies highlight that small and marginal farmers are the most vulnerable as they depend solely on uncertain climatic conditions, fluctuating markets, and limited institutional support. The agricultural crisis in India is no longer a single-issue problem; it is a combination of interlinked factors, including climate change, rising production costs, environmental degradation, livelihood insecurity, and social vulnerability. (Sainath 2004 and Mishra 2012).

The agricultural sector contributes significantly to India's employment, yet its share in GDP has been declining. Research articles on Kerala agriculture especially highlight that despite fertile soil and high rainfall, farmers face challenges due to land fragmentation, crop diseases, and unstable markets. Several studies show that paddy, banana, coconut, and vegetables are the main crops of Kerala, but returns are often low relative to investment. According to agricultural economists, dependence on the monsoon, lack of irrigation infrastructure, and limited access to modern technology make farmers highly vulnerable to shocks. Agriculture remains the primary livelihood for a majority of rural households. Research on Kerala agriculture highlights low profitability, fragmented land, and dependency on rainfall. Major crops like paddy, coconut, and banana often give low returns due to market fluctuations.

2.2.2 Flooding

Post-Annual Flooding refers to the period following recurrent annual floods and the long-term effects these floods have on communities, livelihoods, and the environment. In agricultural regions, annual floods often cause severe damage to crops, farmland, irrigation systems, livestock, and rural infrastructure. Even after floodwaters recede, farmers continue to face challenges such as soil degradation, reduced productivity, financial instability, and lower agricultural income. The impacts of repeated flooding extend beyond immediate losses and affect the overall sustainability of farming and rural livelihoods. In Kerala, recurring floods in recent years have highlighted the agricultural sector's vulnerability to extreme weather events. Farmers frequently struggle to recover from crop losses and restore their livelihoods, making post-annual flooding a significant concern for agricultural development and disaster management. Understanding the consequences of post-annual flooding is essential for developing effective recovery strategies, strengthening resilience, and ensuring sustainable agricultural practices in flood-prone areas. Post-flood conditions often worsen farmers' vulnerability. Fields remain submerged for long periods, delaying sowing and reducing

productivity. The loss of seeds, fertilizers, irrigation systems, and farm equipment increases cultivation costs, while uncertain weather patterns reduce yield predictability. Small and marginal farmers, who depend primarily on agriculture for their livelihood, are the most affected as they lack savings and alternative income sources. Repeated flooding also discourages investment in farming, leading many farmers to abandon agriculture or shift to insecure wage labour. Beyond economic loss, post-annual flooding creates social and psychological stress among farming households. Persistent uncertainty, mounting debts, and the inability to recover fully from previous floods weaken household resilience. While government relief, compensation, and insurance schemes exist, their effectiveness in post-flood recovery varies across regions. Therefore, understanding the lived experiences of farmers after annual floods is essential to capture the depth of agricultural distress and livelihood disruption. This study situates post-annual flooding not merely as a natural hazard but as a structural issue that shapes the ongoing agricultural crisis faced by farmers in Kerala (KSDMA 2019).

2.2.3 Climate Change and Its Impact on Agriculture

Climate change has emerged as one of the most serious threats to agriculture. Studies reveal that irregular rainfall, extended summers, sudden cyclones, and frequent droughts directly affect crop yield. In states like Kerala, unpredictable monsoon patterns and high-intensity rainfall events damage crops and reduce soil fertility. Research also shows that rising temperatures lead to pest infestations and reduced productivity. As a result, farmers face higher risks and lower incomes, making farming less reliable as a livelihood. Climate change has intensified crop losses due to erratic rainfall, rising temperatures, and pest outbreaks. Changes in Kerala's weather patterns have directly reduced crop productivity and increased risks for farmers (IPCC Report, 2021; Down To Earth, 2020).

Globally, climate change threatens agricultural systems by reducing crop yields, degrading soil quality, increasing pest infestations, and disrupting water availability. The Food and Agriculture Organization (FAO) emphasizes that climate variability is already affecting farming communities, particularly smallholder farmers who rely heavily on natural resources for their livelihoods (FAO, 2018). Studies indicate that agricultural losses associated with climate-related disasters have increased significantly over the past few decades, making adaptation and resilience-building essential for sustainable farming systems (FAO, 2023).

2.2.4 Agricultural livelihoods and vulnerability

India is highly vulnerable to climate change due to its dependence on monsoon rainfall and climate-sensitive agricultural systems. Changes in rainfall patterns, rising temperatures, and increased occurrences of floods and droughts have negatively affected agricultural production across the country. Climate variability could significantly reduce agricultural productivity and income, particularly among small and marginal farmers (Kumar and Parikh 2001). Agriculture remains the primary source of livelihood for a large proportion of the rural population worldwide, particularly in developing countries. According to the Sustainable Livelihood Framework developed by the Department for International Development (DFID), livelihoods are influenced by access to natural, financial, human, physical, and social resources. Environmental shocks such as floods, droughts, and climate-related disasters can significantly affect these resources and increase livelihood vulnerability (DFID, 1999).

Globally, smallholder farmers are highly dependent on agriculture and are therefore particularly vulnerable to environmental and economic disruptions. Research indicates that natural disasters negatively affect agricultural productivity, income generation, and household food security, often leading to long-term livelihood challenges. The vulnerability of farming households is further intensified when they have limited access to credit, insurance, and institutional support. Repeated flooding creates cumulative impacts that extend beyond immediate economic losses. The recovery process can be slow and difficult, especially for small-scale farmers who lack adequate financial resources and institutional support. As a result, floods often contribute to long-term livelihood vulnerability and poverty (FAO, 2023).

Climate change has further intensified rainfall variability, increasing the frequency and severity of floods and deepening agrarian distress (IPCC, 2021). Research also indicates that repeated disasters push farming households into debt, reduce savings, and force diversification into insecure non-farm work, thereby weakening long-term livelihood sustainability (UNDP, 2018).

2.2.5 Coping Strategies Adopted by Farmers

Farmers often employ a variety of coping mechanisms following floods and agricultural crises. These include borrowing money, selling livestock or assets, reducing household expenditures, seeking wage labour, and relying on social support networks. Coping strategies have helped

households survive immediate crises but may not always ensure long-term livelihood security (Chambers 1989).

In India, many farming households diversify their income sources through non-farm employment and seasonal migration to reduce dependence on agriculture. Birthal et al. (2014) observed that income diversification has become an important livelihood strategy among rural households facing climatic and economic uncertainties. However, reliance on temporary coping mechanisms can sometimes increase vulnerability, particularly when households accumulate debt or lose productive assets (Birthal 2014).

2.2.6 Climate Change and Crop Loss

Climate change has increased the frequency and intensity of extreme weather events, resulting in significant crop damage worldwide. Rising temperatures, irregular rainfall patterns, floods, droughts, and storms affect crop growth and agricultural productivity. The Intergovernmental Panel on Climate Change. Climate variability is increasingly threatening food production systems and rural livelihoods, especially in developing countries. Crop loss resulting from climate change affects both immediate harvests and long-term agricultural sustainability. Floodwaters often destroy standing crops, reduce soil fertility, and delay future cultivation activities. Such impacts increase production costs and reduce household income, thereby contributing to livelihood insecurity (IPCC, 2021).

Climate change has emerged as one of the greatest threats to agricultural production worldwide. Changes in temperature, irregular rainfall, floods, droughts, and other extreme weather events have significantly affected crop productivity and food security. Agricultural systems that depend heavily on rainfall are particularly vulnerable to these climatic variations. In developing countries such as India, climate change has increased the frequency of crop failures, reduced farm income, and weakened the livelihood security of farming households. Studies have shown that increasing temperatures and changing rainfall patterns negatively influence agricultural productivity, particularly among small and marginal farmers who have limited adaptive capacity and financial resources (Kumar & Parikh 2001 and IPCC, 2021).

In Kerala, the impacts of climate change are reflected in the increasing occurrence of floods, droughts, and other extreme weather events that have caused substantial crop losses and economic hardship for farmers. Recurring floods damage standing crops, reduce soil fertility

through erosion and waterlogging, and increase the incidence of pests and diseases, thereby lowering agricultural productivity. These climate-related risks also increase cultivation costs and reduce farmers' resilience, making sustainable agriculture more difficult. The literature emphasizes that strengthening climate-resilient farming practices, improving water management, promoting crop diversification, and enhancing institutional support are essential for reducing crop losses and ensuring long-term agricultural sustainability (Birthal, 2018; Aryal, 2020).

2.2.7 Economic Instability

Economic instability refers to a situation in which individuals or households experience irregular income, financial insecurity, rising debt, and difficulty maintaining a stable standard of living due to economic or external shocks. In agriculture, economic instability occurs when farmers experience income fluctuations due to factors such as climate change, floods, droughts, crop failures, rising cultivation costs, market price volatility, and limited access to financial support. These conditions reduce farmers' ability to invest in agricultural production, meet household expenses, and sustain their livelihoods over time (Ellis, 2000; Chambers & Conway, 1992).

The problem of indebtedness is widespread among farmers, particularly among small-scale farmers. Farmers borrow money to buy seeds and fertilisers for farming. However, the inability to repay the loans due to repeated crop failures caused by floods, droughts, pest attacks, etc., leaves them trapped in a vicious cycle of debt. They often have to take loans from formal and informal sources for both farming and household expenditures. According to various studies on farmers' debts, rising farming costs, low profitability, and weather-related uncertainties are among the main causes of their indebtedness in rural India (Shetty, 2010; Karam Singh, 2010).

Farmers with smaller plots may face challenges securing loans due to a lack of collateral or savings, leading to higher interest rates and a greater risk of debt. The burden of debt can affect much more than agricultural investment and productivity. The literature suggests that increased access to low-cost institutional credit and improved crop insurance coverage are important to enhancing the economic health of agriculture (Subash 2019 and Taylor 2019).

2.2.8 Policy Gaps and Institutional Support

Agricultural policies play a crucial role in protecting farmers from economic losses, climate-related risks, and natural disasters. Governments worldwide have introduced various measures, including crop insurance, disaster compensation, agricultural subsidies, credit facilities, and climate adaptation programs, to support farming communities. These policies aim to enhance agricultural productivity, strengthen resilience, and ensure livelihood security among farmers. However, the effectiveness of these interventions often depends on their implementation, accessibility, and responsiveness to local needs (FAO, 2018).

The major policy gaps include fragmented disaster management planning, insufficient integration of climate resilience into agricultural policies, and a lack of farmer participation in decision-making. Future-oriented literature stresses the need for livelihood-centric flood management, stronger institutional coordination, inclusive insurance coverage, and localized adaptation planning to enhance resilience among vulnerable farming communities (IFPRI, 2019).

Another major policy gap is the limited coverage and effectiveness of crop insurance programs. While schemes such as the Pradhan Mantri Fasal Bima Yojana (PMFBY) were introduced to reduce farmers' financial risks, many farmers remain excluded because of low awareness, procedural complexities, and delays in claim settlements. Existing policies often focus on immediate disaster relief rather than long-term livelihood recovery and climate adaptation (Gulati 2018).

Government support and agricultural policies play an important role in protecting farmers from economic losses and environmental risks. Governments introduce various programs and schemes to improve agricultural productivity, provide financial security, and support farmers during natural disasters. In India, initiatives such as crop insurance programs, disaster compensation schemes, agricultural subsidies, and rural development projects aim to reduce farmers' vulnerability. Pradhan Mantri Fasal Bima Yojana provides insurance coverage for crop losses caused by natural disasters, pests, and diseases. In addition, agricultural extension services help farmer's access technical knowledge and modern farming practices. Despite these efforts, many farmers' still face difficulties in accessing government support due to lack of awareness, complex procedures, and delays in compensation payments. In some cases, small and marginal farmers are unable to fully benefit from these programs due to limited access to institutions. Strengthening agricultural policies requires better coordination among government agencies, greater farmer awareness, and transparent implementation of support schemes.

Effective government interventions can help farmers recover from disasters, reduce financial stress, and promote sustainable agricultural development (Gulati, Tray, & Hussain, 2018).

Key programs include the Pradhan Mantri Fasal Bima Yojana (PMFBY), Pradhan Mantri Kisan Samman Nidhi (PM-KISAN), Kisan Credit Card (KCC), and various subsidy schemes for irrigation, seeds, and fertilizers (Ministry of Agriculture & Farmers Welfare, 2020).

2.3 Theoretical Framework

Sustainable Livelihoods Framework

The present study is guided by the Sustainable Livelihoods Framework (SLF) developed by Chambers and Conway (1992). According to Chambers and Conway (1992), "A livelihood comprises the capabilities, assets (including both material and social resources), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base." This framework explains how households use their available resources to sustain their livelihoods while facing external shocks such as floods, climate change, and economic crises.

In the context of the present study, recurring floods constitute a major shock affecting farmers' natural, financial, physical, human, and social assets. Crop losses, declining agricultural income, rising cultivation costs, and indebtedness weaken farmers' livelihood security. The framework also highlights the importance of institutional support, such as crop insurance, government compensation, agricultural extension services, and community support, in helping farmers recover from disasters. Therefore, the Sustainable Livelihoods Framework provides an appropriate basis for understanding the challenges farmers face and the strategies they adopt to sustain their livelihoods after recurring floods (Chambers & Conway, 1992).

Resilience Theory (Folke, 2006)

Resilience refers to the capacity of individuals, communities, and systems to absorb disturbances, adapt to changing conditions, and recover from adverse events while continuing to function effectively. According to Folke (2006), resilience emphasizes the ability of social-ecological systems to adapt and transform in response to environmental changes and disasters.

This theory is highly relevant to the present study because farmers in Amaravila, Neyyattinkara, and Kollayil experience repeated flooding, crop losses, economic instability, and climate-related challenges. Despite these difficulties, many farmers adopt coping and adaptation strategies such as crop diversification, mixed farming, seasonal employment, borrowing, and changing cultivation practices. The theory also emphasizes that resilience can be strengthened through effective government policies, institutional support, community participation, and climate-resilient agricultural practices. Thus, Resilience Theory helps explain how farmers respond to recurring floods and what factors enhance or limit their capacity to recover and sustain their livelihoods (Folke 2006).

2.4 Research Gap Analysis

The research focuses specifically on localised post-disaster coping strategies among farmers in Neyyattinkara and Amaravila, leaving a gap in understanding how small and marginal farmers adapt individually and collectively after disasters. There is also a lack of analysis of the effectiveness of informal support systems, such as Kudumbashree groups, cooperatives, and community networks, in these areas. Also, obtaining such insurance properly takes a long time. Several studies have examined the impact of the 2018 and 2019 floods in Kerala on agriculture, highlighting extensive crop damage, soil degradation, and financial losses for farming households. However, most of these studies have focused on state-level or district-level statistics, leaving a gap in understanding the localized challenges faced by farmers at the panchayat level, particularly in Amaravila, Neyyattinkara, and Kollayil. There is a lack of research addressing the psychosocial impacts of disasters on small and marginal farmers, such as anxiety, hopelessness, and the decision to abandon farming. Farmers in Amaravila, Neyyattinkara, and Kollayil Panchayats face recurring livelihood challenges due to annual flooding, climate variability, and related environmental stresses. Floods result in crop loss, agricultural land degradation, economic instability, indebtedness, and reduced agricultural productivity. Despite the existence of government compensation schemes, crop insurance programs, and institutional support mechanisms, many farmers continue to experience difficulties in accessing timely and adequate assistance.

CHAPTER III:
RESEARCH METHODOLOGY

3.1 Introduction

Research methodology refers to the systematic process used by the researcher to collect, analyze, and interpret information related to the study. It provides a clear framework for understanding the methods and procedures used in conducting research. The methodology helps ensure that the study is organized, reliable, and capable of answering the research objectives effectively. It explains how data will be gathered from respondents, the tools used for data collection, and the methods used for analysis (Kothari, 2004).

This study examines the crisis faced by farmers due to repeated post-annual flooding and its effects on agricultural livelihoods, including crop loss, economic instability, livelihood insecurity, and psychological stress. It aims to explore the economic, social, and environmental dimensions of this agricultural crisis, as well as the coping strategies farmers adopt and the role of government and institutional support in helping affected communities recover.

The methodology adopted for this study helps obtain relevant information on farmers' experiences and understand the factors influencing their livelihood conditions. Research methodology is the systematic process for collecting, analysing, and interpreting data to answer research questions and achieve research objectives. It provides the framework that guides the entire research process and ensures the reliability and validity of findings. The present study focuses on understanding the challenges faced by farmers after recurring flood events and examining the support mechanisms that help them recover and sustain their livelihoods. The methodology adopted for this study is designed to explore the experiences, perceptions, coping strategies, and institutional support systems available to farmers in selected disaster-prone areas of Kerala.

3.2. Title of the Study

Agriculture in Crisis: Post-Annual Flooding Challenges and Support Mechanisms for Farmers of Thiruvananthapuram District

3.3 Research Objectives:

1. To study the experiences of farmers in addressing the challenges posed by post-annual flooding
2. To understand the support mechanisms (governmental and non-governmental, community-based available to them?
3. To find the coping strategies for agricultural losses and sustain their livelihoods?

3.4 Definition of Concepts

Agriculture

Conceptual definition: "Agriculture refers to the cultivation of crops, the raising of livestock, and other related activities undertaken to produce food, fibre, and other products that support human livelihoods and economic development" (FAO, 2017).

Operational Definition: Agricultural crisis will be identified through the lived experiences of farmers in the Neyyattinkara, Amaravila, and Kollayil areas. It includes crop losses, livestock mortality, soil erosion, waterlogging, sand deposition, lack of seeds and fertilisers, damaged irrigation facilities and inability to reinvest in farming after a flood.

Livelihood and vulnerability

Conceptual definition: "Livelihood vulnerability denotes the extent to which a household or community is susceptible to harm from exposure to shocks and limited adaptive capacity, particularly in livelihood contexts" (Chambers and Conway, 1992).

Operational Definition: Livelihood vulnerability refers to the extent to which farming households are susceptible to post-disaster setbacks, such as crop loss, income reduction, indebtedness, food insecurity, and a lack of livelihood alternatives. This will be assessed by interviews and FGDS, focusing on economic impacts and coping constraints.

Resilience

Conceptual Definition: "Resilience is the extent to which a system can absorb disturbance and reorganise while undergoing change as to retain essentially the same function, structure, identity, and feedback" (Folke, 2005).

Operational Definition: Resilience refers to the capacity of farmers and farming households in the study areas to bounce back from flood-related disruptions by adopting alternative crops,

utilising community support (e.g., self-help groups, cooperatives), accessing institutional assistance, and rebuilding livelihoods.

3.5 Pilot Study

A pilot study was conducted among a small number of farmers from the selected study area before the main data collection process. The pilot study helped assess the clarity, relevance, and suitability of the interview schedule. It also enabled the researcher to identify potential difficulties in data collection and make necessary modifications to the research instrument. The pilot study contributed to improving the reliability and validity of the final questionnaire.

3.6 Research Design

Research design refers to the overall plan, structure, and strategy adopted by a researcher to answer the research questions and achieve the study's objectives. It provides a systematic framework for collecting, measuring, and analyzing data while ensuring the validity and reliability of the research findings (Creswell, 2014).

The present study adopts a cross-sectional research design. A cross-sectional design involves collecting data from respondents at a single point in time to examine the current status of a phenomenon. It is appropriate for this study because it enables the researcher to assess the challenges faced by farmers after annual flooding, their coping strategies, and the support mechanisms available in Amaravila, Neyyattinkara, and Kollayil areas. The design provides a snapshot of the existing conditions without following respondents over a long period. It is useful for comparing the experiences of farmers across two municipalities (Amaravila and Neyyattinkara) and the Kollayil panchayat, and for identifying patterns related to post-flood agricultural challenges and livelihood conditions.

3.7 Description of Research Site and Participants

Research Site:

The study was conducted in Amaravila, Neyyattinkara (municipality), Kollayil panchayat in Thiruvananthapuram District, Kerala.

Amaravila is a flood-prone area situated near river systems and low-lying agricultural lands. Farmers frequently experience crop damage, soil erosion, and economic losses due to annual flooding. Neyyattinkara is characterized by recurring waterlogging and flood-related agricultural challenges. Farmers face delayed compensation, unstable market prices, and reduced agricultural productivity. Kollayil experiences comparatively fewer flood events but faces severe water scarcity during the summer seasons. Farmers often struggle with irrigation issues and declining agricultural productivity.

Participants:

The participants of the study consisted of 80 farmers selected through purposive sampling. The respondents included owner cultivators, leaseholders, and tenant farmers who were actively engaged in agricultural activities and had experienced the impacts of post-annual flooding. These participants were chosen because they possessed firsthand knowledge and experience regarding crop loss, economic challenges, coping strategies, and the support mechanisms available in the study area.

3.8 Sampling Strategy

Sampling strategy refers to the method used by a researcher to select participants from the target population for inclusion in a study. It ensures that the selected sample is appropriate for addressing the research objectives (Creswell, 2014).

The study adopted purposive sampling as the sampling strategy. Purposive sampling is a non-probability sampling technique in which respondents are selected based on specific characteristics relevant to the research objectives. In this study, farmers from Amaravila, Neyyattinkara, and Kollayil areas who had experienced the impacts of annual flooding and were actively engaged in agriculture were purposively selected. This method enabled the researcher to collect detailed and relevant information from participants with direct experience of post-flood agricultural challenges, coping strategies, and available support mechanisms.

3.9 Data Collection

Data collection is the systematic process of gathering information from relevant sources to answer research questions and achieve a study's objectives. It involves collecting accurate and reliable data using appropriate research instruments and procedures (Creswell, 2014).

The data for this study were collected from 80 farmers in Amaravila, Neyyattinkara, and Kollayil areas using a structured interview schedule.

Primary data are the original data collected directly by the researcher from respondents for the specific purpose of the study. These data are gathered firsthand using methods such as interviews, questionnaires, observations, or schedules, making them more relevant and specific to the research objectives (Kothari, 2004).

Primary data were collected through face-to-face interviews with the farmers to understand their socio-demographic details, farming practices, flood-related challenges, crop losses, income, coping strategies, and the support they received.

Secondary data, Bryman (2016) describes secondary data as "Data that has already been collected and published by others. It involves analyzing pre-existing information such as books, journals, government reports, research articles, and official documents. After data collection, the information was organized, coded, and analysed to achieve the objectives of the study.

3.10 Method of Data Collection

For this study, data were gathered using a structured survey questionnaire aimed at obtaining clear and relevant information from farmers engaged in agriculture in the Trivandrum district. The questionnaire consisted of multiple-choice and yes/no questions. Since the farmers had limited familiarity with digital forms, the researcher filled out the Google Form on their behalf.

3.11 Tools for Data Collection

A structured questionnaire was used to gather quantitative data on agricultural losses and coping mechanisms adopted by farmers. In addition, key informant interviews were conducted with agricultural officers and municipal leaders to gain further insight into the issue.

- **Structured Questionnaire** used to gather quantitative data on agricultural losses and coping mechanisms.
- **Key informant Interviews** (Agricultural officers, municipal leaders)

3.12 Data Analysis

Data analysis is the process of organising, coding, summarising, and interpreting collected data to answer the research questions and achieve the study's objectives. It helps the researcher identify patterns, relationships, and meaningful findings from the collected information (Creswell, 2014).

After collecting the completed questionnaires, all responses were carefully checked for completeness and accuracy, and any errors or inconsistencies were corrected before proceeding further. The verified data were then coded and entered into Microsoft Excel to facilitate systematic organisation and analysis. Excel was used to organise responses, tabulate frequencies, and calculate percentages for each question, as well as to generate simple graphical representations such as bar charts and pie charts, and summary tables for easy interpretation.

To carry out a more detailed statistical analysis, the data were further analysed using SPSS (Statistical Package for the Social Sciences). Cross-tabulation was employed to examine relationships among variables, such as the association between farm size and adopted coping strategies, or between income level and the extent of crop loss. In addition, the Chi-square test was applied to determine whether the observed relationships between variables were statistically significant or merely due to chance. This combination of descriptive and inferential statistical techniques enabled the researcher to identify common patterns and problems faced by farmers, understand the strength of association between key variables, and draw meaningful conclusions regarding the impact of post-annual flooding on agricultural livelihoods.

3.13 Ethical Consideration

Ensured all respondents are fully informed about the purpose and procedures of the study before they agree to participate.

- Protected the identity and personal information of the respondents.
- Participation was completely voluntary, and respondents had the right to withdraw from the study at any stage.
- The names and personal details of the participants were not disclosed in the study.

3.14 Assumptions, Limitations, and Scope

Assumptions

- The respondents provided honest and accurate information during the interview.
- The selected farmers have adequate knowledge and experience regarding post-annual flooding and its impacts.
- The structured interview schedule was appropriate for collecting reliable data.
- The selected sample represents the farming communities of Amaravila, Neyyattinkara, and Kollayil.
- The findings of the study reflect the existing challenges and support mechanisms related to post-annual flooding.

Limitations

- The study was limited to 80 farmers from Amaravila, Neyyattinkara, and Kollayil Panchayats.
- The findings are based on the responses of the selected respondents and may not represent all farmers in Kerala.
- The study focused only on post-annual flooding and related agricultural challenges.
- Limited time and financial resources restricted the scope of data collection.

Scope of The Study

The present study focuses on the post-annual-flooding challenges and support mechanisms experienced by farmers in Amaravila, Neyyattinkara, and other areas of the Thiruvananthapuram district, Kerala. It examines the impact of recurring floods and related environmental challenges on agriculture, livelihoods, and farmers' socio-economic conditions. The study also explores the coping and adaptation strategies adopted by farmers and assesses the effectiveness of government schemes, institutional support, and other assistance available for agricultural recovery. The findings of the study are expected to contribute to improving disaster management, agricultural policies, and sustainable livelihood development for farming communities in the selected study areas.

CHAPTER IV: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

Data analysis is a systematic process of organizing, interpreting and evaluating data to uncover meaningful patterns and insights. In this quantitative research, data were collected primarily through Google Forms (Cresswell, 2014).

This chapter presents the analysis and interpretation of the data collected from farmers in Amaravila, Neyyattinkara, and Kollayil areas of Thiruvananthapuram district. The data were collected from 80 respondents using a structured interview schedule. The researcher used Google Forms to collect the data, and it was filled out by the researcher for all respondents. The findings are presented under different themes, including socio-demographic profile, farm profile, agricultural challenges, economic impacts, market-related issues, and coping strategies adopted by farmers after annual flooding. The analysis helps to understand the extent of the agricultural crisis and the effectiveness of existing support mechanisms. In this study, the data collected through a structured interview schedule were coded, entered into Microsoft Excel and SPSS, and analysed using descriptive statistics, including percentages and graphs. The findings are presented systematically under different sections, including the socio-demographic profile of the respondents, agricultural characteristics, impacts of post-annual flooding, economic conditions, coping strategies, and support mechanisms. Each figure is followed by a detailed interpretation that explains the findings in relation to the study's objectives. The analysis provides a clear understanding of the challenges farmers face and the effectiveness of existing institutional support systems in the selected study areas.

4.2 Socio-Demographic details of the respondents

The demographic profile of the respondents provides essential background information that helps in understanding the context of the data collected. It includes details such as gender, age, educational status, landholding size, land ownership status, farming experience, and farming type. These demographic factors are crucial for analysing farmers' livelihood conditions in agriculture.

Table 4.2.1 Socio-Demographic Profile of Respondent

Socio-demographic characteristics of the participants (N=80)			
Socio-demographic Variables		N	%
Age (in years)	40-49	6	7.50
	50-59	42	52.50
	60-70	32	40.00
Education status	Illiterate	3	3.75
	Primary	34	42.50
	Secondary	34	42.50
	Higher Secondary	5	6.25
	Graduate & Above	4	5.00
Landholding size	Landless	6	7.50
	Marginal (<1 ha)	8	10.00
	Small (1-2 ha)	41	51.25
	Medium (2-4 ha)	24	30.00
	Large (>4 ha)	1	1.25
Land ownership status	Owner	70	87.50
	Leaseholder	5	6.25
	Tenant	5	6.25
Farming experience (years)	<5 years	2	2.50
	6-10 years	57	71.25
	11-20 years	22	27.50
Farming type	Subsistence	17	21.25

	Commercial	36	45.00
	Mixed	26	32.50

4.2.1 Age Distribution

The study found that most respondents in were to the 50–59-year age group, followed by the 60–70-year age group. Only a few respondents were between 40 and 49 years.

This indicates that agriculture in the selected Panchayats is mainly carried out by middle-aged and older farmers. The low participation among younger people suggests declining interest in farming, possibly due to low profitability, climate-related risks, and migration to other occupations. The relatively low participation of younger farmers indicates a gradual decline in youth involvement in agriculture. This may be attributed to factors such as low profitability, increasing production costs, climate-related risks, uncertain agricultural income, and the migration of younger generations to non-agricultural occupations in search of better employment opportunities. The ageing farming population may pose challenges for the future sustainability of agriculture, as fewer young people are available to adopt innovative farming practices and continue agricultural activities.

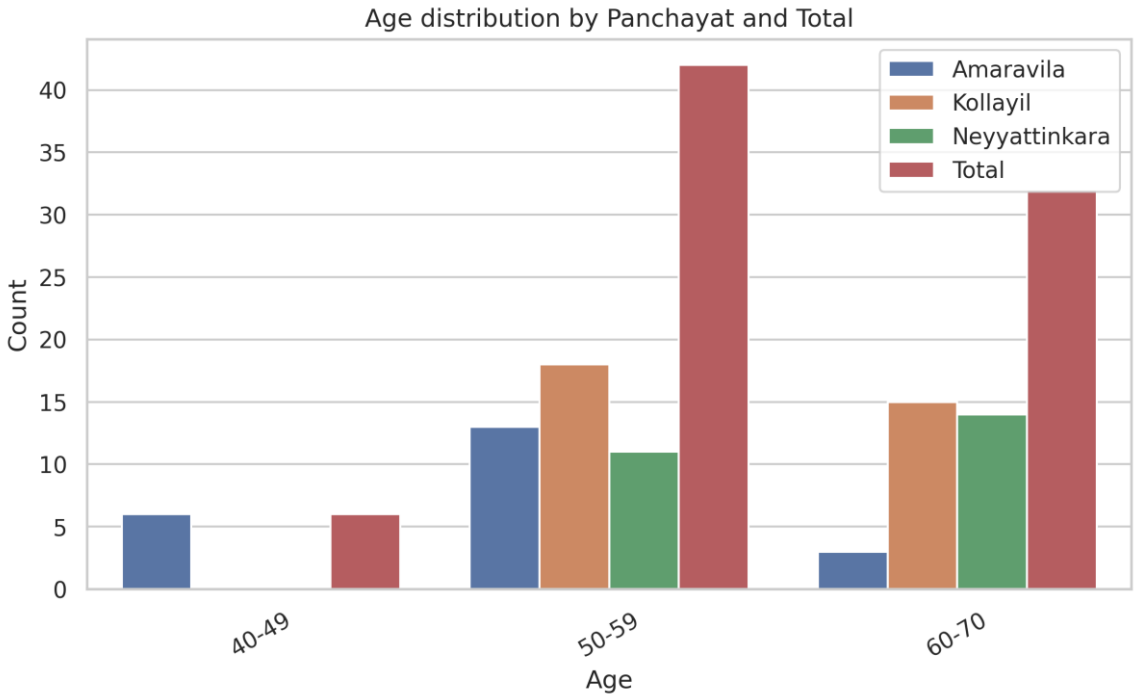

Figure 4.2.1Age Distribution

4.2.2 Educational Status

The educational status of respondents varied among the three Panchayats. Amaravila had a comparatively higher number of respondents with secondary and graduate education. Kollayil was dominated by farmers with primary education, while Neyyattinkara had the highest proportion of respondents with secondary education.

This indicates that although literacy levels are satisfactory, higher education among farmers remains limited. Lower educational attainment may reduce awareness about modern agricultural practices, government schemes, and climate-resilient farming technologies. Education plays an important role in enhancing farmers' knowledge, decision-making abilities, and adoption of improved agricultural practices. Farmers with higher levels of education are generally more likely to access information on modern farming techniques, climate-resilient agriculture, government welfare schemes, crop insurance programmes, and new technologies. They are also better equipped to understand market trends, manage financial resources, and make informed decisions regarding agricultural investments. On the other hand, the farmers with lower educational attainment may face difficulties in accessing agricultural information, understanding official procedures, applying for government assistance, and adopting scientific farming methods. This may reduce their capacity to cope with the challenges posed by recurring floods and climate variability. Therefore, improving farmers' awareness through agricultural extension services, training programmes, and capacity-building initiatives can bridge the knowledge gap and strengthen agricultural resilience.

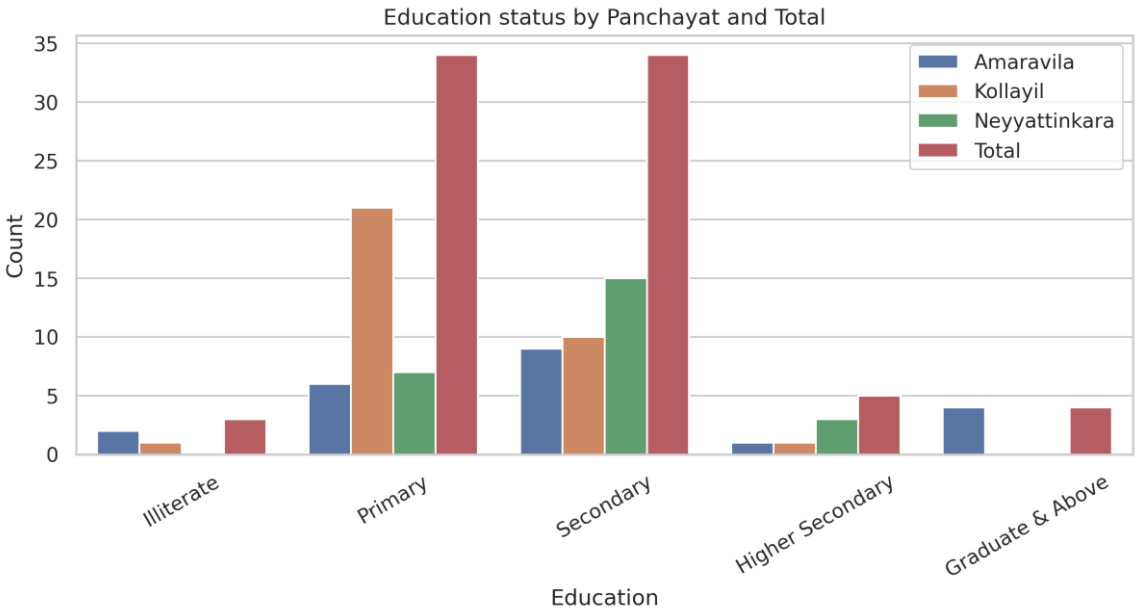

Figure 4.2.2 *Educational Status*

4.2.3 Landholding Size

Most respondents were small farmers (less than 2 hectares). Neyyattinkara had a relatively higher number of medium landholders, whereas large landholdings were very few in all Panchayats.

This shows that farming in the study area is predominantly small-scale agriculture. Small landholdings limit production capacity and increase farmers' vulnerability to flood-related losses. Small landholdings often restrict the scale of agricultural production and limit farmers' ability to diversify crops or adopt advanced farming technologies. Farmers with limited land generally produce smaller quantities of crops, resulting in lower incomes and reduced economic security. They are also more vulnerable to natural disasters such as floods, as damage to even a small area of cultivated land can significantly affect their annual income and household livelihood.

The small and marginal farmers also face constraints in investing in climate-resilient agricultural practices, irrigation facilities, improved seeds, farm machinery, and soil conservation measures. Due to limited financial resources, many farmers struggle to recover from crop losses and often rely on loans, government compensation, or external assistance after disasters. This increases their economic vulnerability and reduces their capacity to withstand future climate-related risks.

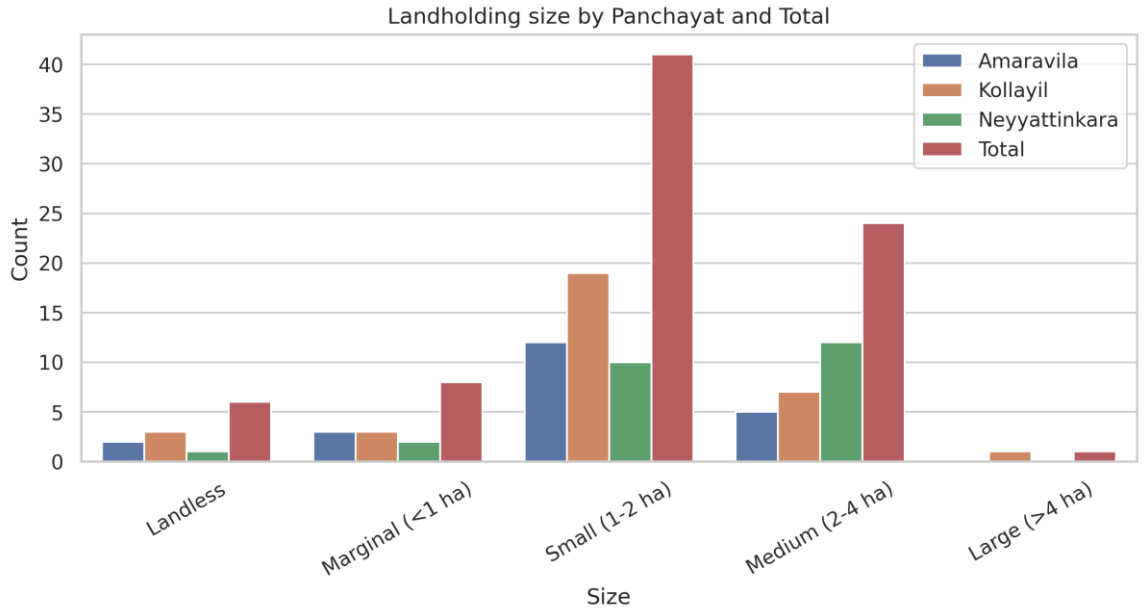

Figure 4.2.3 Landholding Size

4.2.4 Land Ownership

The majority of respondents were owner cultivators, while only a few were leaseholders or tenant farmers. This suggests that most farmers cultivate their own land. However, ownership alone does not protect farmers from economic losses caused by floods and climate variability**.** The findings indicate that the majority of respondents were owner cultivators, while only a small number were leaseholders or tenant farmers. This shows that most farmers in Amaravila, Neyyattinkara, and Kollayil cultivate their own agricultural land and have direct control over farming activities and decision-making. Land ownership provides farmers with a sense of security and encourages long-term investment in agriculture, such as improving soil fertility, developing irrigation facilities, and adopting better farming practices. However, owning agricultural land does not necessarily protect farmers from the adverse impacts of recurring floods and climate variability. Owner-cultivators continue to face significant challenges, including crop losses, soil degradation, waterlogging, rising cultivation costs, and declining agricultural income. These problems often reduce farm productivity and create financial stress, even for farmers who own their land. Repeated natural disasters can also affect the value and productivity of agricultural land, making recovery more difficult. Leaseholders and tenant farmers face additional challenges because they often have limited access to government compensation, crop insurance, and institutional credit compared with owner-cultivators. They may also be required to pay rent despite crop losses.

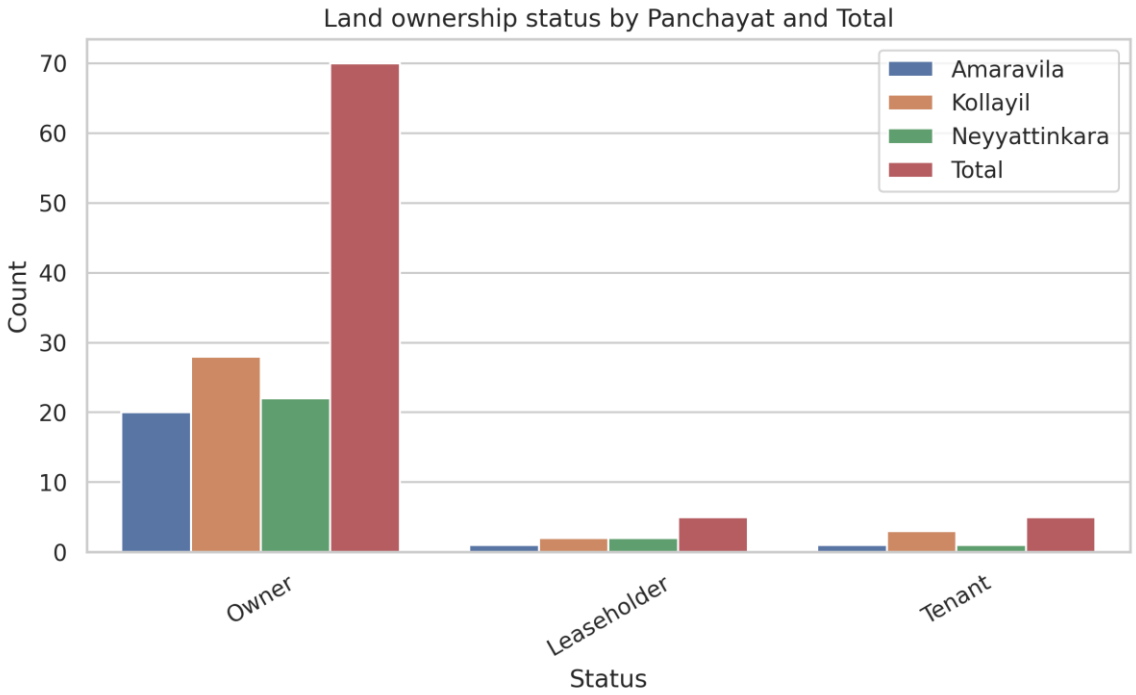

Figure 4.2.4 Land Ownership

4.2.5 Farming Experience

Most respondents had 6–10 years of farming experience, followed by those with 11–20 years. This indicates that respondents possess considerable farming knowledge and practical experience. However, even experienced farmers continue to face serious challenges due to recurring floods and changing climatic conditions. Farming experience plays an important role in improving agricultural decision-making and the ability to respond to changing climatic conditions. Experienced farmers are generally more familiar with crop selection, pest and disease management, irrigation practices, and traditional methods of coping with floods and other natural hazards. Their long-term involvement in agriculture enables them to identify changes in rainfall patterns, soil conditions, and crop productivity, helping them adapt their farming practices to some extent.

Despite their experience, the respondents continue to face significant challenges due to recurring floods, waterlogging, climate variability, rising cultivation costs, and fluctuating market prices. These factors have reduced agricultural productivity and increased financial uncertainty, making it difficult even for experienced farmers to sustain their livelihoods. The findings suggest that farming experience alone is not sufficient to overcome the impacts of

climate-related disasters without adequate institutional support and access to modern agricultural technologies.

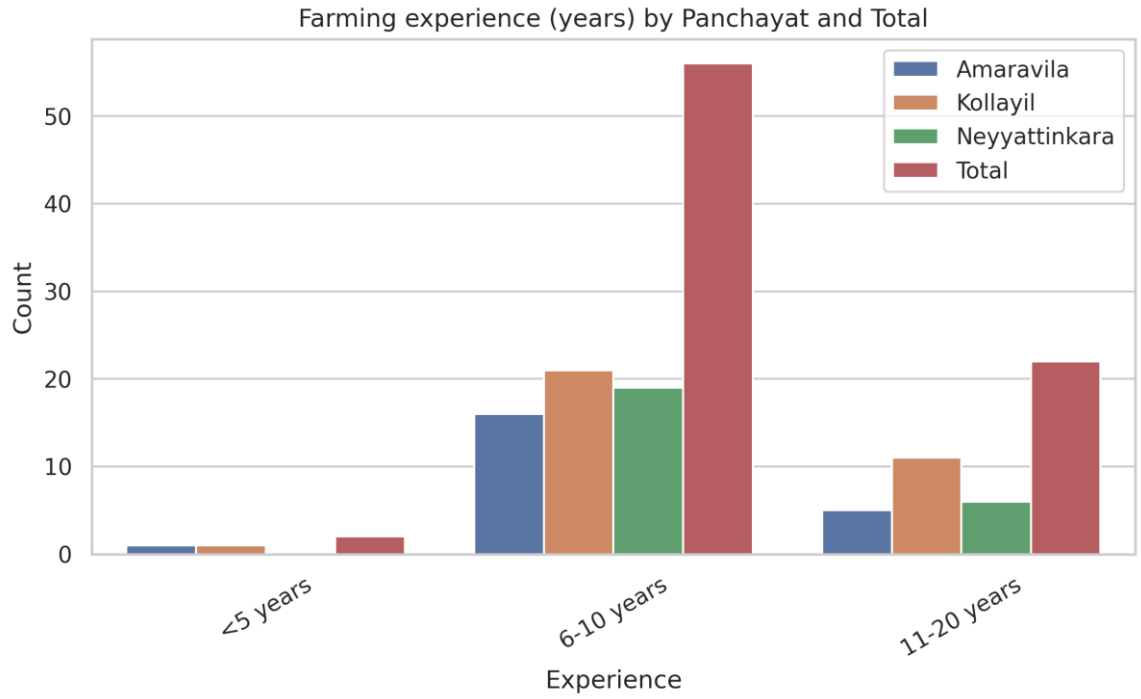

Figure 4.2.5 Farming Experience

4.2.6 Farming Type

Commercial farming was the dominant farming practice in Amaravila, while mixed farming was more common in Kollayil and Neyyattinkara. This shows that farmers are gradually diversifying agricultural activities to reduce risks associated with dependence on a single crop.

The prevalence of mixed farming in Kollayil and Neyyattinkara suggests that farmers are gradually diversifying their agricultural activities to reduce the risks of relying on a single crop. By combining different farming enterprises, farmers can minimize the impact of crop failures caused by floods, droughts, pests, or market fluctuations. Mixed farming also improves the efficient use of available resources, enhances soil fertility through integrated farming practices, and provides additional income from livestock, dairy, poultry, or horticulture.

Commercial farmers, although they may earn higher returns during favourable seasons, are often more vulnerable to economic losses when natural disasters such as floods damage their crops. Since their income largely depends on the successful cultivation and sale of a few commercial crops, recurring floods, rising production costs, and unstable market prices can significantly affect their financial stability. In contrast, farmers practising mixed farming have

relatively greater resilience because income is generated from multiple agricultural activities, reducing dependence on a single source of livelihood.

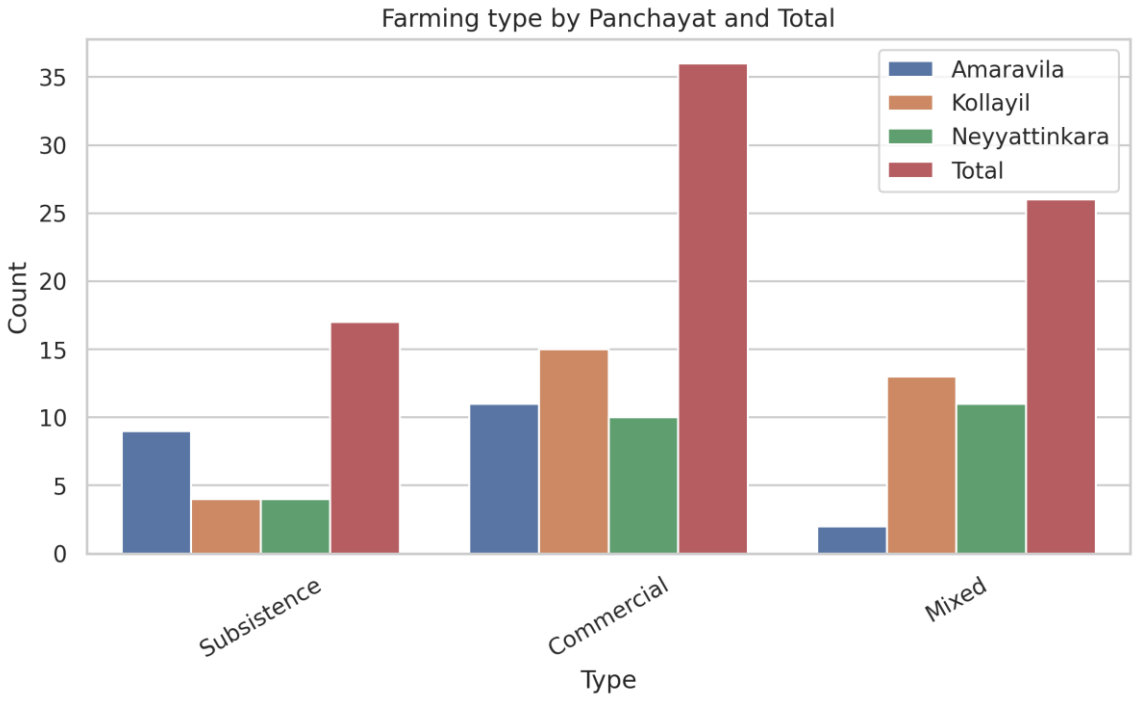

Figure 4.2.6 Farming Type

4.3 Agricultural Profile

4.3.1 Major Crops Cultivated

Banana was identified as the major crop cultivated in all three Panchayats, followed by vegetables and coconut. Rice cultivation was comparatively lower. This indicates that banana cultivation plays a significant role in farmers' livelihoods. However, banana crops are highly vulnerable to flood damage, making farmers economically vulnerable. The findings indicate that banana is the major crop cultivated by farmers in Amaravila, Neyyattinkara, and Kollayil Panchayats, followed by vegetables and coconut, while rice cultivation is comparatively lower. This suggests that banana cultivation is the primary agricultural activity and a major source of income for most farming households in the study area. The preference for banana cultivation may be due to its relatively high market demand, greater income potential, and suitability for local climatic and soil conditions.

The cultivation of vegetables and coconut further contributes to household income and food security by providing additional sources of revenue and reducing dependence on a single crop. However, the comparatively lower cultivation of rice indicates a gradual shift from traditional

paddy farming to the cultivation of commercially viable crops. Factors such as labour shortages, increasing cultivation costs, changing land-use patterns, and reduced profitability may have contributed to this transition.

Although banana cultivation provides better economic returns under favourable conditions, it is highly susceptible to damage from floods, waterlogging, and strong winds. Floods can destroy banana plantations within a short period, resulting in substantial crop losses and severe financial setbacks for farmers. Similarly, vegetable cultivation is sensitive to excessive rainfall and pest infestations, while coconut plantations may also be affected by prolonged flooding and soil degradation. As a result, farmers who depend heavily on these crops are exposed to considerable production and income risks during a crisis.

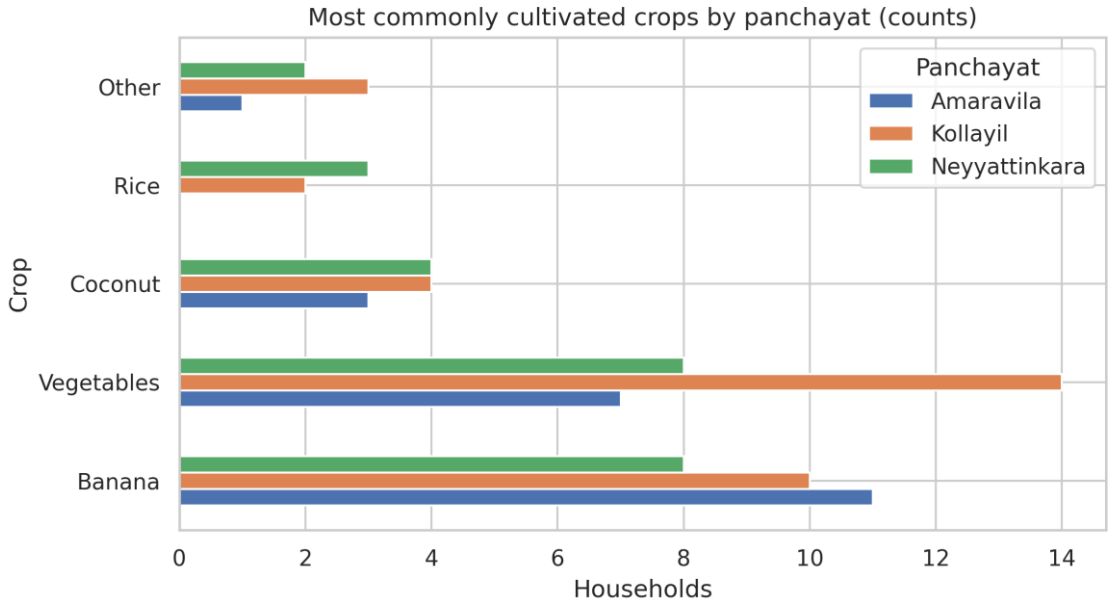

Figure 4.3.1 Major Crops Cultivated

4.4 Primary Source of Income

Crop farming was the principal source of income for most respondents, while a smaller proportion depended on wage labour, livestock, or non-farm occupations.

This indicates that household income largely depends on agriculture. Therefore, crop losses directly affect the economic stability of farming households**.** The findings reveal that crop farming is the principal source of income for the majority of respondents in Amaravila, Neyyattinkara, and Kollayil Panchayats. A smaller proportion of respondents depend on wage

labour, livestock rearing, or non-farm occupations to supplement their household income. This indicates that agriculture remains the backbone of the local economy and the primary means of livelihood for most farming households. The heavy dependence on crop cultivation reflects the limited availability of alternative employment opportunities in the rural areas.

Since most households rely primarily on agriculture, any disruption in farming activities directly affects their economic stability and overall quality of life. Crop losses from recurring floods, waterlogging, climate variability, pest outbreaks, or other environmental factors reduce agricultural income, making it difficult for farmers to cover cultivation expenses and household needs. In addition, fluctuations in market prices and rising input costs further reduce farming profitability, increasing financial stress among agricultural households.

Although some respondents engage in wage labour, livestock rearing, and other non-farm activities, these sources generally provide only supplementary income and are often insufficient to offset major agricultural losses. Consequently, many farmers experience financial insecurity, depend on loans or external assistance, and struggle to recover after disasters. This dependence on a single source of livelihood increases their vulnerability to economic shocks.

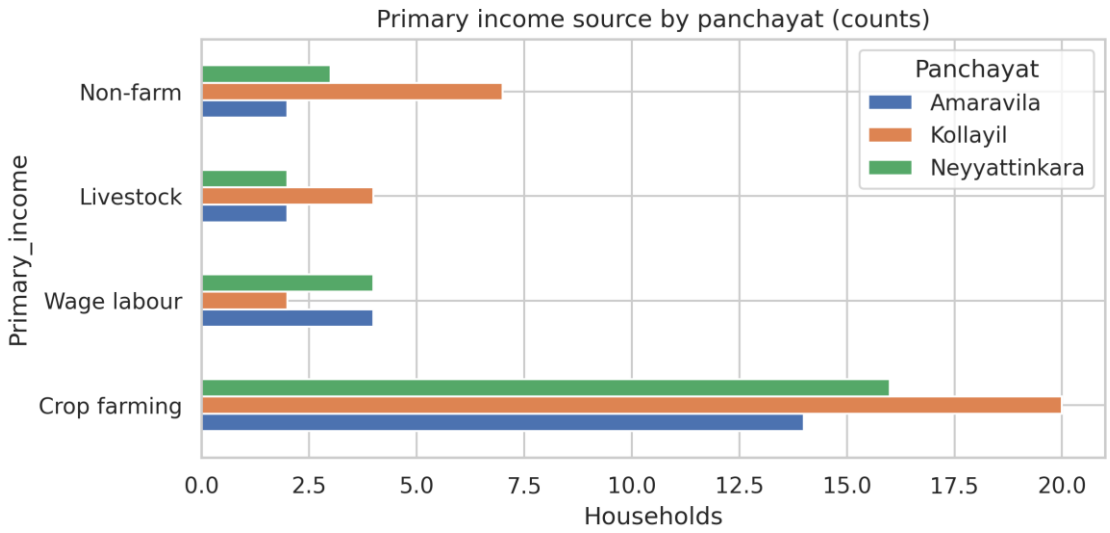

Figure 4.4 Primary Source of Income

4.5 Agricultural Challenges

4.5.1 Causes of Crop Loss

Floods and pest attacks were the major causes of crop loss in Amaravila and Neyyattinkara. In Kollayil, drought and lack of irrigation were the major problems.

This indicates that climate-related hazards vary across locations. While flood management is essential in Amaravila and Neyyattinkara, improved irrigation facilities are more important in Kollayil. The findings reveal that the causes of crop loss differ across the three study areas due to variations in their geographical and climatic conditions. In Amaravila and Neyyattinkara, the major causes of crop loss were recurring floods and pest attacks, whereas in Kollayil, drought and inadequate irrigation facilities were identified as the primary challenges affecting agricultural production. These findings indicate that farmers in the selected areas experience different forms of climate-related risks, which directly influence crop productivity and livelihood security.

Flooding in Amaravila and Neyyattinkara causes extensive damage to standing crops by submerging agricultural fields, resulting in waterlogging, soil erosion, nutrient loss, and damage to irrigation infrastructure. Excess moisture also creates favourable conditions for the spread of pests and crop diseases, further reducing agricultural productivity. Frequent floods not only destroy crops but also increase cultivation costs, as farmers must invest additional resources to restore their land and resume farming activities. These recurring losses reduce household income and increase financial stress among farming families. In contrast, farmers in Kollayil are more affected by water scarcity during the summer season, which limits irrigation and reduces crop yields. The lack of reliable irrigation facilities makes agriculture highly dependent on rainfall, increasing farmers' vulnerability during periods of low precipitation. Insufficient water availability also restricts crop diversification and discourages farmers from cultivating water-intensive crops, thereby affecting agricultural productivity and income.

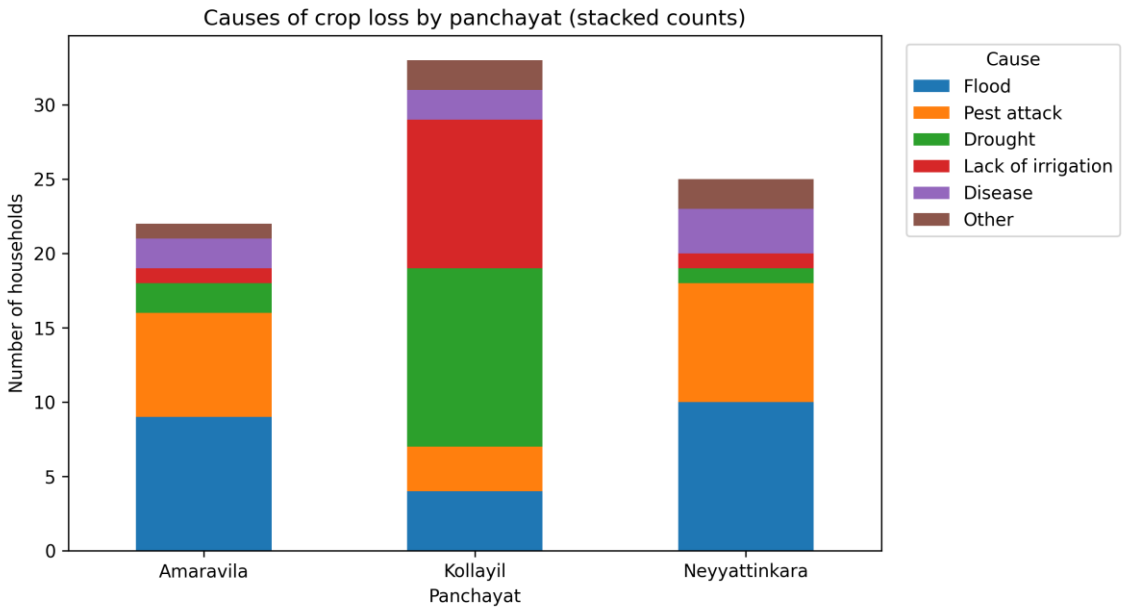

Figure 4.5.1 Causes of Crop Loss

4.5.2 Agricultural Income Change

Most respondents reported a decrease in agricultural income after recurring floods. Only a few respondents experienced no change or an increase in income. This indicates that annual flooding has significantly reduced farm income and affected the economic sustainability of farming households. The decrease in agricultural income can be attributed to several factors, including crop losses, reduced productivity, damage to agricultural land, rising cultivation costs, and volatile market prices. Floods often destroy standing crops, delay planting and harvesting, and damage irrigation systems and farm infrastructure. Farmers are therefore forced to spend additional money on land restoration, purchasing seeds and fertilizers, repairing equipment, and hiring labour, which further reduces their net income. In addition, recurring climate-related disasters discourage continuous agricultural investment and increase financial uncertainty.

Lower agricultural income also has broader social and economic consequences. Many farmers struggle to repay agricultural loans, meet family needs, support children's education, and invest in improved farming technologies. Some respondents may seek alternative employment or depend on wage labour and other non-farm activities to supplement their income. However, these alternative sources are often temporary and insufficient to offset the financial losses from repeated floods.

Only a small proportion of respondents reported no change or an increase in income, which may be due to factors such as crop diversification, mixed farming, access to irrigation facilities, effective farm management, or additional income from livestock and non-farm occupations. These farmers may have been better able to cope with climate-related risks and reduce the economic impact of flooding.

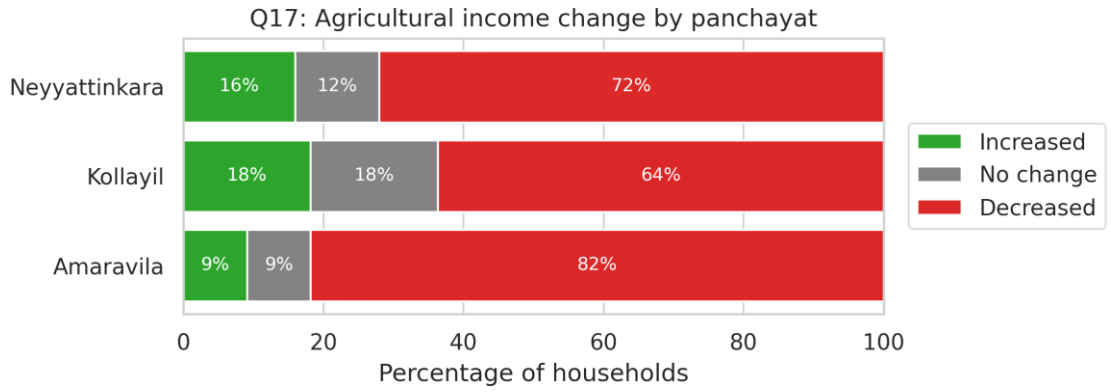

Figure: 4.5.2 Agricultural income change

4.5.3 Severity of Farming Crisis

Most respondents perceived the farming crisis as high or very high, especially in Amaravila and Neyyattinkara. This suggests that farmers experience severe economic, environmental, and livelihood challenges because of recurring floods and rising cultivation costs. as high. Only a small proportion of respondents considered the farming crisis to be moderate or low. This indicates that farmers in the selected Panchayats are facing serious, persistent challenges that threaten the sustainability of agriculture and their livelihoods. The repeated occurrence of floods and other climate-related hazards has significantly increased the vulnerability of farming households.

The high level of perceived farming crisis is mainly due to recurring crop losses, waterlogging, soil degradation, pest infestations, rising cultivation costs, delayed compensation, and unstable market prices. These factors have reduced agricultural productivity and profitability, making it increasingly difficult for farmers to recover from repeated losses. Many respondents reported that the financial burden of restoring damaged fields, purchasing agricultural inputs, and repaying loans has become a major challenge.

In Amaravila and Neyyattinkara, where floods occur more frequently, farmers face continuous disruptions in cultivation and income generation. Repeated flooding damages standing crops, affects soil fertility, and delays agricultural activities, resulting in long-term economic hardship. In contrast, farmers in Kollayil face fewer floods but experience water scarcity during the summer, which also affects crop production and livelihood security. Although the nature of the challenges differs across the Panchayats, all respondents reported that climate-related risks have made farming increasingly uncertain.

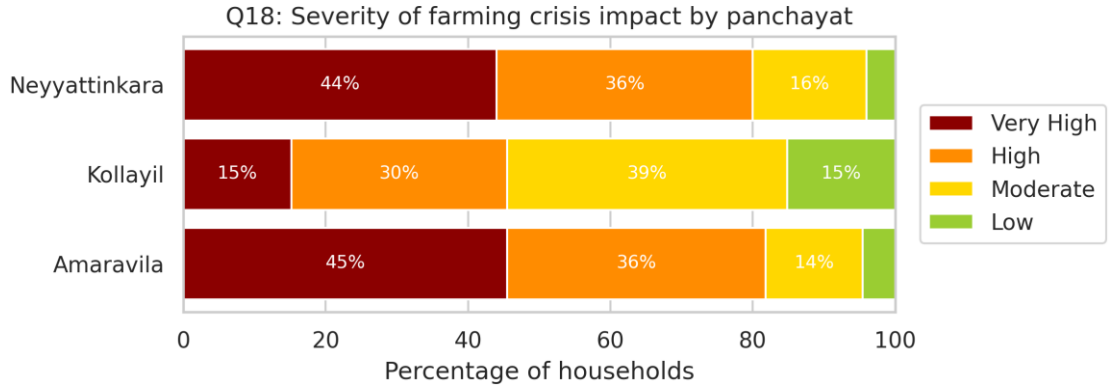

Figure: 4.5.3 Severity of farming crisis

4.5.4 Effect of Rising Input Costs

The majority of respondents stated that increasing prices of seeds, fertilizers, labour, and pesticides had a negative impact on farming. This indicates that rising production costs reduce farmers' profits and increase financial stress, especially after repeated crop failures. Only a few respondents believed that increasing input costs had little or no effect on their agricultural production. This indicates that the continuous increase in production expenses has become a major challenge for farmers in Amaravila, Neyyattinkara, and Kollayil areas.

The increase in input costs has reduced farmers' profit margins, making agriculture less economically viable. Farmers are now required to invest more money before cultivation begins, but the returns from farming often remain uncertain due to recurring floods, climate variability, pest attacks, and fluctuating market prices. As a result, even when farmers obtain a good harvest, the high cost of production reduces their overall income and financial stability.

The situation becomes more severe after repeated crop failures caused by floods and other environmental hazards. Farmers who have already suffered financial losses often find it

difficult to purchase quality seeds, fertilizers, and pesticides for the next cultivation season. Many are forced to depend on loans from banks, cooperative societies, or informal moneylenders, increasing their indebtedness and financial burden. Small and marginal farmers are particularly affected because they have limited savings and fewer financial resources to cope with rising production costs.

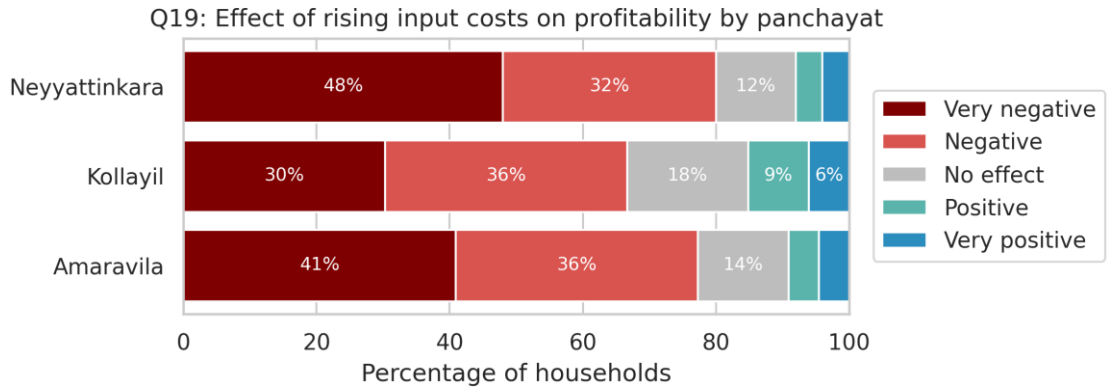

Figure: 4.5.4 Effect of rising input cost

4.6 Economic Impacts

4.6.1 Degree of Savings Depletion

Many respondents reported that their savings had been completely depleted or significantly reduced after repeated agricultural losses. This shows that farmers are forced to use their savings to meet cultivation expenses and household needs, reducing their financial security. Only a small proportion of respondents stated that their savings remained unaffected. This indicates that repeated crop failures and declining agricultural income have seriously weakened the financial security of farming households in Amaravila, Neyyattinkara, and Kollayil Panchayats.

Farmers often depend on their personal savings to meet cultivation expenses such as purchasing seeds, fertilizers, pesticides, hiring labour, and maintaining irrigation facilities. When crops are damaged by floods or other environmental hazards, they receive little or no income from agriculture and are forced to use their savings to cover both farming expenses and daily household needs. As a result, many respondents reported that they had exhausted their financial reserves, making it difficult to recover from future disasters.

The depletion of savings also affects farmers' ability to invest in the next cropping season. Without sufficient savings, many farmers struggle to purchase quality agricultural inputs, adopt improved farming technologies, or invest in climate-resilient agricultural practices. Consequently, they become increasingly dependent on loans from banks, cooperative societies, or informal moneylenders, which further increases their financial burden and the risk of indebtedness.

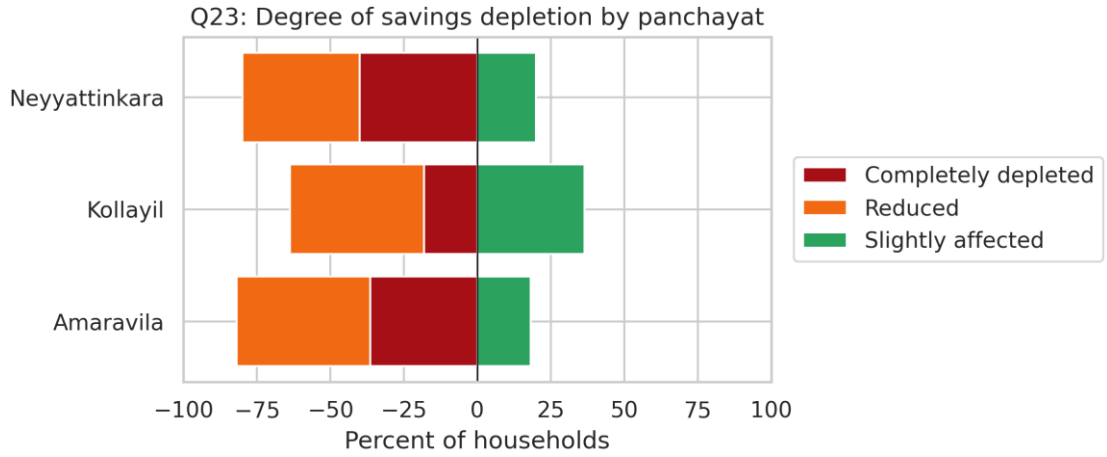

Figure: 4.6.1 Degree of savings depletion

4.6.2 Changes in Household Expenditure

Many respondents reduced essential and non-essential household expenditures, while some reported difficulty in meeting even basic household needs.

This indicates that agricultural losses have affected the overall living standards of farming families. Some respondents stated that they had difficulty meeting even their basic household needs, while only a few reported no significant change in their expenditure patterns. This indicates that the decline in agricultural income has directly affected the financial stability and living conditions of farming households in the Amaravila, Neyyattinkara, and Kollayil areas.

Agriculture is the primary source of income for most respondents; crop failures caused by recurring floods, waterlogging, drought, and other climate-related challenges have reduced household earnings. Consequently, many families have been forced to cut expenses for food, clothing, healthcare, education, transportation, and social activities. In some cases, farmers

postponed the purchase of agricultural inputs or household assets in order to manage their limited financial resources.

The reduction in household expenditure reflects the financial stress experienced by farming families after repeated agricultural losses. Respondents reported prioritising essential needs while avoiding non-essential spending. However, some households found it difficult to afford even basic necessities such as nutritious food, medical treatment, children's education, and routine household expenses. Such financial constraints can negatively affect the overall well-being, health, and quality of life of farming families.

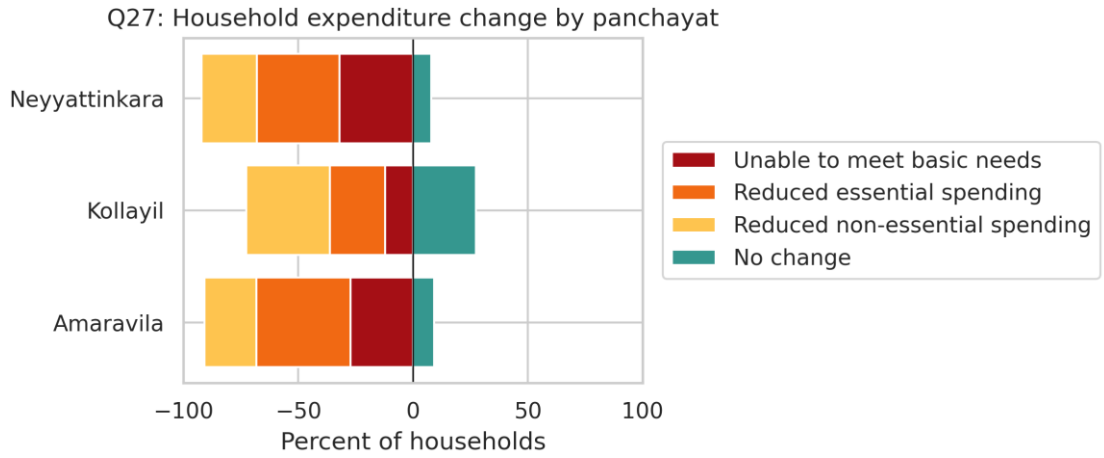

Figure :4.6.2 Changes in household expenditure

4.7 Market-Related Problems

4.7.1 Market Problems

The major market-related problems reported by farmers included low prices and delayed payments, which are the most significant agricultural production expenses. Other input costs such as seeds, pesticides, irrigation, and transportation, also contributed to production costs but were reported as comparatively less burdensome. This indicates that the rising costs of labour and fertilisers have become a major financial challenge for farmers in the Amaravila, Neyyattinkara, and Kollayil areas. The increase in labour costs is largely due to labour shortages, migration of rural workers to non-agricultural sectors, and increasing daily wage rates. As a result, farmers have to spend more on hiring workers for land preparation, planting, weeding, harvesting, and post-harvest activities. For small and marginal farmers, rising labour costs significantly reduce farming profitability and make cultivation financially difficult.

Similarly, the rising price of fertilizers has increased the overall cost of cultivation. Fertilizers are essential for maintaining soil fertility and improving crop productivity, but many farmers reported that the increasing prices make it difficult to purchase the required quantity. Some farmers reduce fertilizer usage to lower production costs, which may negatively affect crop yield and quality. In addition, repeated floods often wash away applied fertilizers, forcing farmers to reapply them and incur additional expenses.

The combined effect of increasing labour and fertilizer costs places considerable financial pressure on farming households, particularly after repeated crop losses caused by floods and climate variability. Many farmers struggle to balance rising production costs with declining agricultural income, resulting in lower profit margins and greater reliance on loans or other external financial assistance. This situation affects both agricultural productivity and the overall economic stability of farming households.

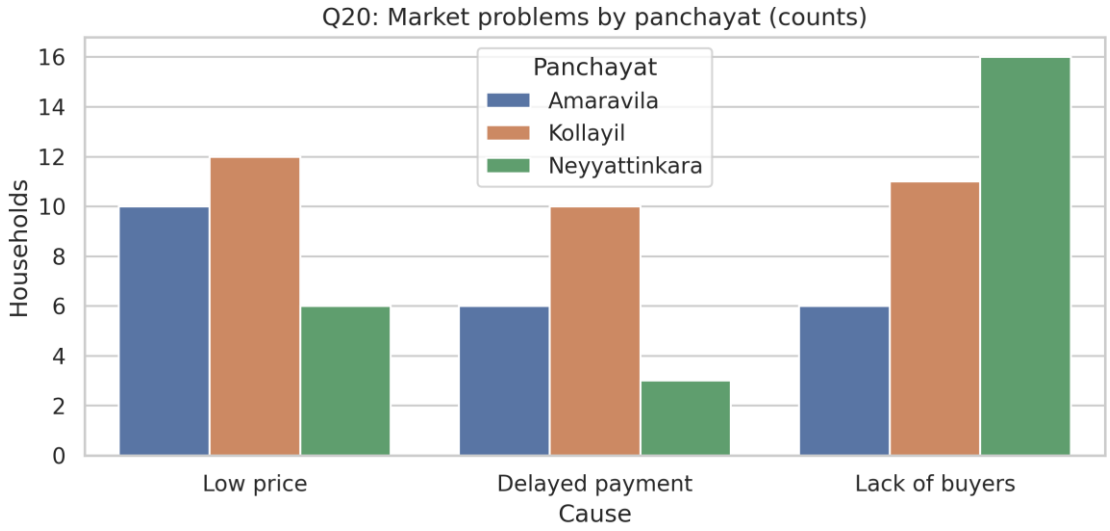

Figure: 4.7.1 Market problems

4.7.2 Most Affected Input Cost

Labour and fertilizer costs were identified as the most significant production expenses. This indicates that increasing labour shortages and fertilizer prices have become major financial burdens for farmers. The findings reveal that labour and fertilizer costs were identified by the majority of respondents as the most affected agricultural input costs. Although farmers also spend on seeds, pesticides, irrigation, and transportation, labour and fertilizers account for the largest share of production expenses. This indicates that the continuous increase in these input

costs has become a major financial burden for farming households in Amaravila, Neyyattinkara, and Kollayil areas.

The increasing cost of labour is mainly attributed to labour shortages, migration of rural workers to non-agricultural occupations, and rising wage rates. As a result, farmers have to spend more on essential farming operations such as land preparation, planting, weeding, harvesting, and post-harvest activities. This has significantly increased the overall cost of cultivation, particularly for small and marginal farmers who have limited financial resources.

Similarly, the rising price of fertilizers has further increased production costs. Fertilizers are essential for maintaining soil fertility and improving crop productivity, but many farmers reported difficulty in purchasing adequate quantities due to high prices. In flood-affected areas, fertilizers are often washed away by floodwaters, forcing farmers to apply them again, which further increases cultivation expenses. These additional costs reduce farming profitability and place greater financial pressure on agricultural households.

The high expenditure on labour and fertilizers, combined with recurring crop losses, fluctuating market prices, and delayed compensation, has reduced farmers' net income and increased their dependence on loans and external financial support. Many respondents reported that rising production costs have discouraged them from expanding cultivation or investing in improved agricultural technologies.

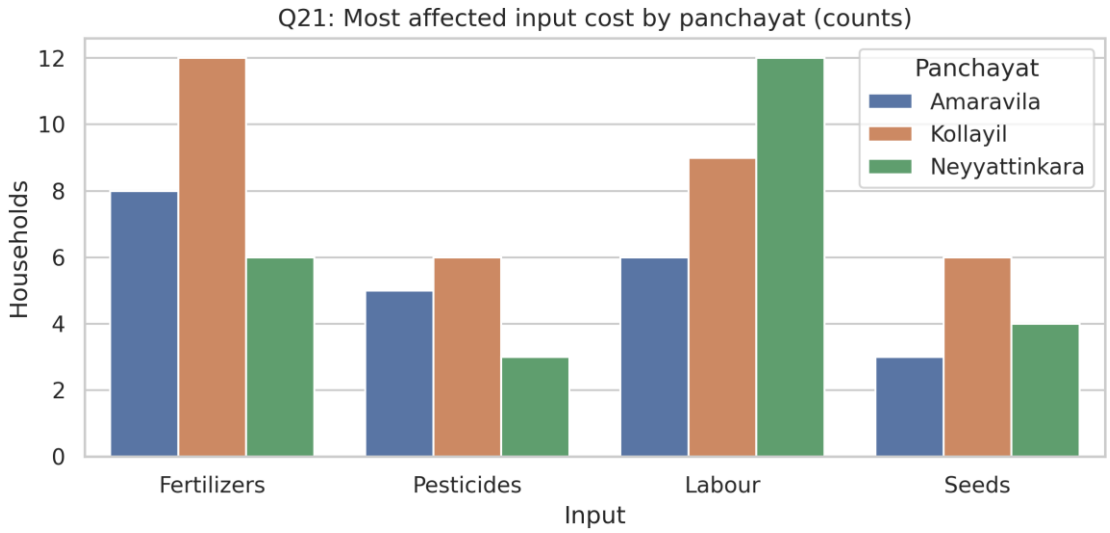

Figure: 4.7.2 Most affected input cost

4.8 Coping Strategies and Adaptation

The study found that selling assets was the most common coping strategy adopted by respondents. Other coping strategies included borrowing loans, engaging in wage labour, and seasonal migration.

This indicates that many farmers depend on short-term survival strategies rather than long-term adaptation measures. Selling productive assets may help meet immediate financial needs but can reduce future agricultural productivity and increase livelihood vulnerability. The findings indicate that most farmers rely on immediate survival strategies to cope with financial crises rather than adopting long-term adaptation measures that can strengthen agricultural resilience.

Selling productive assets such as livestock, agricultural equipment, or household valuables helps farmers meet urgent expenses, including cultivation costs, loan repayments, healthcare, education, and daily household needs. However, this strategy weakens their long-term economic security, as the loss of productive assets reduces their capacity to invest in future agricultural activities and recover from subsequent disasters. Farmers who sell their assets often find it difficult to resume farming at the same level of productivity.

Borrowing loans from banks, cooperative societies, or informal moneylenders was another common coping strategy. While loans provide temporary financial relief, repeated borrowing due to recurring crop losses often leads to indebtedness and increased financial stress. Similarly, many respondents reported engaging in wage labour or seasonal migration to earn additional income during periods when farming activities were disrupted. Although these strategies provide short-term support, they do not address the underlying challenges affecting agricultural sustainability.

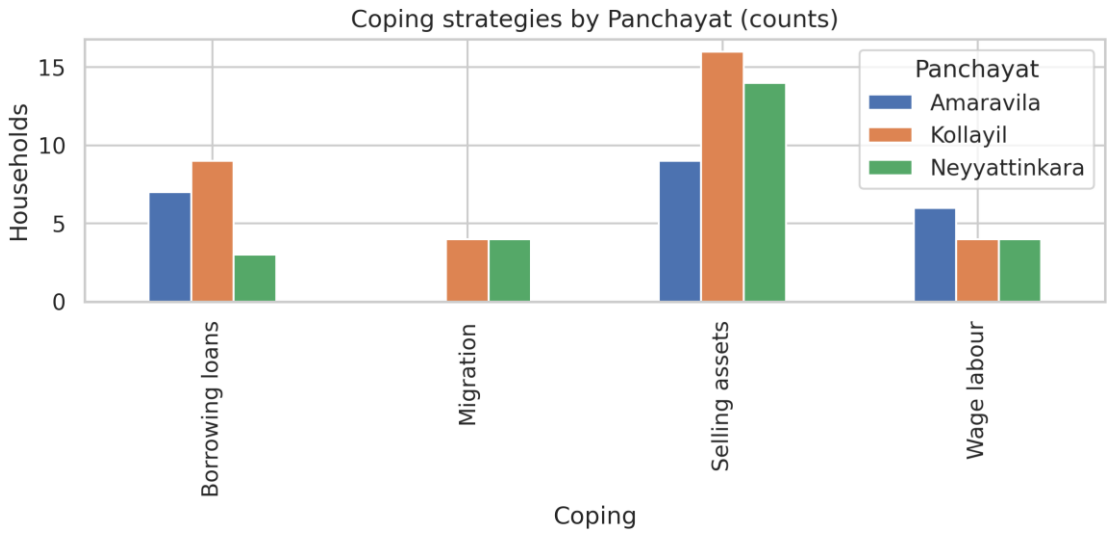

Figure: 4.8 Coping strategies

CHAPTER IV:
FINDINGS, SUGGESTIONS AND CONCLUSION

5.1 Introduction

This chapter presents the study's findings and recommendations. The findings are based on information collected from 80 farmers through a structured interview schedule. The data were carefully organized, coded, and analyzed using descriptive statistical methods such as frequency and percentage. The results are presented in the form of tables and graphs to facilitate better understanding and interpretation. The chapter examines the socio-demographic characteristics of the respondents, the agricultural challenges they face after recurring floods, the economic impacts on their livelihoods, the coping and adaptation strategies they adopt, and the effectiveness of the support mechanisms available to them. Based on these findings, practical suggestions are offered to strengthen farmers' resilience and improve agricultural recovery, followed by the study's overall conclusion.

5.2 Findings

The study found that the majority of respondents were middle-aged farmers, particularly those aged 50-59, indicating that agriculture in the selected Panchayats is largely managed by experienced farmers, while the participation of younger people remains limited. Most respondents had secondary-level education, with only a few having completed higher education. The majority were owner cultivators with small landholdings of less than two hectares, reflecting the predominance of small-scale farming in Amaravila, Neyyattinkara, and Kollayil. Most respondents had between six and twenty years of farming experience and depended primarily on crop cultivation as their main source of income. Banana was identified as the major crop cultivated, followed by vegetables and coconut, whereas rice cultivation was comparatively limited.

The study also revealed that the major agricultural challenges varied across the selected Panchayats. Farmers in Amaravila and Neyyattinkara mainly experienced crop losses due to recurring floods and pest attacks, while those in Kollayil faced water scarcity and inadequate irrigation facilities. Most respondents reported a significant decline in agricultural income after recurring floods and perceived the farming crisis as severe because of repeated crop losses, rising cultivation costs, unstable market prices, and climate variability. Labour and fertilizer

costs were identified as the major production expenses, placing additional financial pressure on farmers and reducing agricultural profitability.

The findings further showed that repeated agricultural losses had serious economic consequences for farming households. Many respondents reported that their household savings had been completely depleted or significantly reduced, and several were forced to reduce both essential and non-essential household expenditures. Selling productive assets, borrowing loans, engaging in wage labour, and seasonal migration were the most common coping strategies adopted by farmers to overcome financial difficulties. Although government support mechanisms such as compensation, subsidies, and crop insurance were available, many respondents expressed dissatisfaction with delays in receiving assistance and the limited effectiveness of existing support systems. Overall, the study highlights the need for stronger institutional support, timely compensation, climate-resilient farming practices, and improved disaster management measures to enhance the resilience and sustainability of agriculture in the study area.

5.3 Suggestions

Based on the study's findings, several measures are recommended to improve farmers' resilience and livelihoods in the selected Panchayats. The government should ensure timely and adequate compensation for crop losses caused by floods and other climate-related disasters. Crop insurance schemes should be strengthened and made more accessible to small and marginal farmers through simplified procedures and increased awareness. Agricultural departments should promote climate-resilient farming practices, improved crop varieties, and sustainable land and water management techniques through regular training and extension programmes. Special attention should be given to improving drainage systems in flood-prone areas such as Amaravila and Neyyattinkara, while irrigation facilities and water conservation measures should be strengthened in Kollayil to address seasonal water scarcity.

The study also recommends providing subsidies for quality seeds, fertilizers, and farm machinery to reduce production costs and improve farm profitability. Farmers should be encouraged to adopt crop diversification, integrated farming, and other alternative livelihood activities to reduce dependence on a single source of income. Access to institutional credit

should be improved to reduce reliance on informal moneylenders and minimize indebtedness. Greater coordination among government departments, local self-government institutions, agricultural extension services, and non-governmental organizations is essential to ensure effective implementation of agricultural support programmes. Strengthening disaster preparedness, early warning systems, and community-based adaptation initiatives will further enhance farmers' capacity to cope with future climate-related challenges

In terms of recommendations for improving farmers' resilience and livelihoods, it is important for the government to ensure timely and sufficient compensation for losses that arise from flooding and other climate disasters. More so, crop insurance schemes should be improved so that small and marginal farmers can directly benefit from them through simplified procedures and increased awareness. There should also be a push towards the adoption of climate-resilient practices, improved crop varieties, and sustainable land and water management by the various ministries involved in agriculture, through regular training and extension services. Attention should be paid to improving drainage systems in flood-prone areas like Amaravila and Neyyattinkara, and to improving irrigation structures and practices, so as to ensure that water is conserved in areas such as Kollayil.

The study's findings indicate the need to provide subsidies for quality seeds, fertilisers, and agricultural equipment to reduce costs and increase farm profitability. Farmers should also be encouraged to adopt crop diversification, integrated farming, and other economic diversification activities, so that they do not have to depend solely on a single source of income.

5.4 Conclusion

The study reveals that the economic conditions of farmers in the Amaravila, Neyyattinkara, and Kollayil Panchayats of Thiruvananthapuram district have been affected by post-annual flooding. The problems of repeated flooding, waterlogging, climate change, high cost of cultivation, and fluctuations in the market prices of agricultural products have resulted in lower agricultural output and reduced income for farmers. Due to these factors, the farmers are becoming poorer and facing many difficulties in continuing their agricultural activities. They are also facing severe challenges, such as depleting their savings, going into debt, and reducing

their household expenditures. The aid and schemes provided by the government are not very useful in helping farmers due to delays in compensation payments and limited accessibility.

The study highlights the importance of developing climate-resilient agriculture, along with irrigation and drainage systems, to improve agriculture in the region. Effective measures for coping with post-annual flooding can improve farmers' farming conditions. Efforts for agricultural development need to be made jointly by all institutions involved in financial and agricultural activities.

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ANNEXURE 1: INTERVIEW SCHEDULE

1. Name of respondent:
2. Area of Residence: a) Neyyattinkara b) Kollayil c) Amaravila
3. Age
4. Gender: a) Male b) Female
5. Education status: a) Illiterate b) Primary c) Secondary d) Higher Secondary e) Graduate and above f) Other
6. Primary occupation a) Farming b) Agricultural labour c) Allied activities d) Non-farm work e) Others
7. Annual household income:
8. Landholding size: a) Landless b) Marginal (<1 ha) c) Small (1–2 ha) d) Medium (2–4 ha) e) Large (>4 ha)
9. Ownership status: a) Owner. b) Tenant c) Leaseholder
10. Farming experience: a) <5 years. B) 6–10 years. c) 11–20 years. d) >20 years. e. Others
11. Type of farming practised: a) Subsistence b) Commercial c) Mixed d) Other
12. Primary crops cultivated: a)Vegetables b).Banana cultivation c) Tapioca d.Fruits e.Other:
13. Main source of income : a) Crop farming b)Livestock c.Wage labour d.Non-farm activities e.Other:
14. Major reasons for crop loss : a)Drought b) Flood c)Pest attack d)Price fluctuation e)Lack of irrigation
15. Continuity of farming across generations in the household : a)Farming practiced for three or more generations b)Farming started in the present generation c)Farming recently adopted d) Farming started because of no other jobs e) Other:
16. Has climate variability affected your farming activities: a)Severely b) Moderately c)Slightly d) Not at all e)Other:
17. Change in agricultural income in recent years : a.Increased b.Decreased c.No change d.Other:

18. Impact of farming crisis on household livelihood : a)Very high b)High c) Moderate d)Low e) Other

19. Impact of rising input prices on farm profitability: a)Very high b)high moderate c) Low d)Other

20. Type of market problem faced most frequently : a) Low price b)Delayed payment c)Lack of buyers d) Transportation issues e)Other:

21. Which input cost has increased the most? a) Seeds b)Fertilizers c)Pesticides d)Labour e)Other)

22.Type of risk the farmer feels most exposed to in daily life: a)Financial insecurity b)Climate uncertainty c)Market instability d)Health-related risks e)Other:

23. Effect of agricultural distress on family savings : a)Completely depleted b)Reduced c)Slightly affected d) Not affected e)Other

24. Major factor contributing to reduced agricultural productivity:

a) Climate variability b) Rising input costs c) Soil degradation d) Water scarcity

25. Level of livelihood insecurity caused by farming uncertainty:

a) Very high b) High c) Moderate d) Low

26. Change in household expenditure patterns due to farm income decline:

a) Unable to meet basic needs b) Reduced essential spending c) Reduced non-essential spending d) No major change

27. Frequency of crop loss experienced in the last 5 years:

a) Every year b) Once in two years c) Rarely d) Never

28. What coping strategy do you use during crop failure?

a) Borrowing loans b) Selling assets c) Wage labour d) Migration

29. Have you adopted any climate-resilient practices?

a) Yes, If yes explain b) No

30. Types of adaptation measures adopted:

a) Crop diversification b) Mixed farming c) Improved seeds d) Water conservation

31. Degree of reliance on migration as a coping mechanism:

a) Permanent migration b) Seasonal migration c) Occasional migration d) No migration

32. Adoption level of improved seed varieties:

a) Regular b) Occasional c) Rare d) Not adopted

33. Migration as a coping strategy: a) Seasonal b) Permanent c) Not migrated

34. Preferred coping option during severe agricultural loss:

a) Loan from banks b) Loan from moneylenders c) Wage labour d) Migration

35. Role of livestock in supporting household income:

a) Major support b) Moderate support c) Minor support d) No support

36. Long-term adaptation approach preferred by the household:

a) Diversified livelihood strategy b) Technological modernization c) Dependence on institutional support d) Exit from agriculture

37. Source of guidance while adopting coping strategies:

a) Elder farmers in the village b) Agricultural officers c) Fellow farmers' experience d) Personal trial and error

38. Alternative income activity adopted along with farming:

a) Daily wage labour b) Livestock rearing c) Small business or self-employment d) No alternative activity

39. Adoption level of improved seed varieMain action taken immediately after crop failure:

a) Applied for crop insurance or compensation b) Borrowed money to continue farming c) Shifted to wage labour d) Reduced cultivation in the next seasonties: a) Regular b) Occasional c) Rare d) Not adopted

40) Type of water management practice adopted:

a) Rainwater harvesting b) Drip/sprinkler irrigation c) Traditional methods d) No practice

41. Preferred coping option during severe agricultural loss:

a) Loan from banks b) Loan from moneylenders c) Wage labour d) Migration

42.Role of farmer producer organizations (FPOs):

a) Very helpful b) Somewhat helpful c) Not helpful d) Not present

43.If yes, which scheme benefited you most?

a) PMFBY (Crop Insurance) b) PM-KISAN c) Subsidy schemes d) Loan waiver

44. Accessibility of institutional credit: a) Easy b) Moderate c) Difficult d) Not accessible

45. Sources of credit used: a) Banks b) Cooperatives c) Moneylenders d) SHGs

46. Effectiveness of agricultural extension services: a) Very effective b) Effective c) Poor d) Not available

47. Support received during crisis situations: a) Adequate b) Inadequate c) No support

48. Awareness level about government schemes: a) High b) Moderate c) Low d) No awareness

49. Main source of information on schemes: a) Government officials b) Media c) Fellow farmers d) NGOs

50. Problems faced in accessing schemes:

a) Documentation b) Delay c) Corruption d) Lack of guidance

51.Type of government support accessed during agricultural difficulty:

a) Crop insurance or compensation b) Cash assistance schemes c) Input subsidy (seeds, fertilizer, machinery) d) No support accessed

52. Role played by farmer groups / cooperatives:

a) Helped in input purchase b) Helped in marketing produce c) Helped in accessing schemes d) No involvement

53. Support received from non-government organizations or SHGs:

a) Financial assistance b) Skill training or livelihood support c) Awareness and counselling d) No NGO/SHG support

54. Type of support received during crop failure:

a) Financial compensation b) Input subsidy c) Advisory services d) No effective support

55. Effectiveness of local governance (Panchayat) support:

a) Effective b) Moderately effective c) Ineffective

56.Long-term need for securing farmers' livelihood:

a) Income assurance b) Market stability c) Climate resilience d) Comprehensive policy reform c) Partially

57. Major gaps in current agricultural policies:

a) Delayed support b) Poor implementation c) Low awareness d) Corruptio

58. What support do farmers need the most?

a) Assured price b) Crop insurance c) Irrigation facilities d) Credit access

59.Perception on future of agriculture:

a) Hopeful b) Uncertain c) Pessimistic

60.Will you encourage the next generation to continue farming? a) Yes b) Noc) Not sure

61.Suggested measures for improving farmers' livelihood:

a) Policy reform b) Technological support c) Financial assistance d) Market stability

62.Willingness to adopt new farming innovations:

a) Very willing b) Willing c) Reluctant d) Not willing

63. Adequacy of minimum support price (MSP):

a) Highly adequate b) Moderately adequate c) Inadequate d) Not applicable

64.Main gap felt in existing agricultural policies:

a) Delay in delivery of benefits b) Lack of region-specific planning c) Limited awareness among farmers d) Weak monitoring and follow-up

65. Role expected from technology in future farming:

a) Supporting climate-resilient practices b) Improving productivity and efficiency c) Reducing labour dependency d) Limited role without policy backing

66. Need for farmer training and skill development:

a) High b) Moderate c) Low

67. Perception of government responsiveness to farmers' issues:

a) Very responsive b) Moderately responsive c) Poorly responsive d) Not responsive

68.Expectation from government in future:

a) Income security b) Market support c) Risk protection d) All of the above

69.Experience with minimum support price (MSP) system:

a) MSP covers cost of cultivation b) MSP exists but is difficult to access c) MSP does not reflect market realities d) Produce sold without MSP support

70) Stability of agricultural income over the last five years:

a) Very unstable b) Unstable c) Mostly stable d) Stable

71)View on encouraging younger generation to take up farming:

a) Encourage with modern technology support b) Encourage only with income security c) Leave the choice to individual interest d) Discourage due to existing risks

72) Major risk perceived in farming activities:

a) Climate uncertainty b) Market price fluctuation c) Input cost rise d) Crop disease

73)Main gap felt in existing agricultural policies:

a) Delay in delivery of benefits b) Lack of region-specific planning c) Limited awareness among farmers d) Weak monitoring and follow-up

74) Extent of benefit received from farmer training programs:

a) Highly beneficial b) Moderately beneficial c) Slightly beneficial d) Not beneficial

75) Effectiveness of market linkages for selling produce:

a) Very effective b) Effective c) Poor d) Very poor

76)Priority support needed during agricultural crisis:

a) Immediate financial aid b) Crop insurance support c) Input subsidy d) Market price support

77)Level of participation in farmer groups or collectives:

a) Active participation b) Occasional participation c) Passive membership d) Not a member

78)Impact of delayed payments on household expenses:

a) Severe impact b) Moderate impact c) Minor impact d) No impact

79)Long-term expectation from agricultural reforms:

a) Improved income security b) Reduced farming risk c) Better market access d) Sustainable livelihoods

81. Do you have any suggestions or recommendations to address the current crisis in agriculture in your locality?

82. Which crop suffered the maximum loss in the latest flood ?

a.paddy b.vegetables c. coconut d. banana cultivation

83. Did the flood damage irrigation structures [canal,bund,pumb] in your area ?

a. yes b. no

82. Which crop suffered the maximum loss in the latest flood ?

a.paddy b.vegetables c. coconut d. banana cultivation

83. Did the flood damage irrigation structures [canal,bund,pumb] in your area ?

a. yes b. no

84. How much time did you lose in re cultivation after the last flood?

a. days b.weeks c.months

85. After the last flood, did you change your cropping pattern? a.yes b.no

86. How many family members are engaged in agriculture?